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## **THERAPEUTIC ACTION OF OXYGEN.**



ON THE  
THERAPEUTIC ACTION  
OF  
OXYGEN,  
WITH  
CASES PROVING ITS SINGULAR EFFICACY  
IN  
VARIOUS INTRACTABLE DISEASES.

BY  
S. B. BIRCH, M.D.

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## P R E F A C E.

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THE writer hopes that the following pages may be of some service by drawing professional attention to a much neglected, but highly important subject in Therapeutics.

If a mode of treatment, not generally adopted, prove eminently useful in the hands of any member of our Profession, he is bound to give the result of his experience for the benefit of all.

Any hypothesis which the writer entertains is offered with all due respect to the opinions of scientific brethren who may differ with him; but the facts set forth as the result of his practical application of the treatment here advised are not presented thus deferentially. They afford quite sufficient evidence that oxygen may be employed as a valuable medicinal agent. Experimentally convinced of this truth, to advocate it becomes a duty which requires no apology.

S. B. B.

KENSINGTON,  
AND  
46, REGENT STREET, PICCADILLY.  
*September 25th, 1857.*



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## INTRODUCTION.

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*Omitted from Index.*

Severe Periodic Head-ache with Dysmenorrhœa—page 108.

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## ERRATA.

Page 21—For “debilitated” *read* “lessened.”

Page 23—For “impaired” *read* “damaged.”

Page 27—For “as the results of” *read* “to long continuance of.”

Page 54—For “how mucus foetid gases are” *read* “mucus—and how foetid gases are.”

pathological conditions upon which disease depends.

To no remedial agent can the motto "*Tutò citò et jucundè*" be so truly applied, when judiciously advised.

In considering oxygen as a valuable remedy, applicable in many intractable diseases, the question should not be "Is it new?" but "Is it true?"—the question should not be "Who is he who recommends?" but "What is it which is recommended?"—the question should not be "Is it in our *Materia Medica*?" but "Ought it to be in our *Materia Medica*?"—the question is not "Does Dr. A. or Dr. B. prescribe it?" but "Are there any known facts proving its utility which will warrant the profession in employing it?"

We are constantly exhibiting remedies, not because science has *à priori* taught us their *modus operandi* on the animal economy, but because observed facts prove that they possess a certain specific action on it. Chemistry may ascertain for us the active principle of a medicine; it can go further, and shew the proportion and arrangement of the elementary atoms of that active principle; but chemistry does not teach us why this active principle causes, arrests, or modifies peculiar actions in the living organism; the knowledge that it does so is all we have, and this is only acquired by observation of the fact. Hence a sufficient number of well-recognized facts, proving the utility of a

remedy, must be considered sufficient reason for employing it,—especially when it can be shewn that it meets emergencies for which we cannot provide an equally effective substitute. I might rest my advocacy of oxygen as a therapeutic on facts alone; but we have, in using this agent, scientific light to aid us. Physiology teaches the nature of its action on the organism and thus elevates it to a higher scale in medicine than the major part of our remedies; when certain desirable results are attained we have science to explain the *rationale* of such results. Organic chemistry especially instructs us as to the necessity of oxygen for the support of health and life as a matter of scientific deduction; electricity and galvanism in their relation to organic forces are leading us to a perception of the part which oxygen fulfils in generating animal nervous power; while if we chose to ignore all science we may simply make the "*experimentum crucis*;" stop our respiration, and enquire how we feel without this element—or we could sit a few hours daily in an atmosphere in which the natural quantity of oxygen was reduced, the effects observed would prove that a due supply of oxygen cannot be dispensed with if we would maintain either life or even health at its proper standard.

There is not anything new in suggesting oxygen as a remedy. My professional brethren must nearly



all be aware that towards the close of the last, and during the first part of the present century, it was used by Drs. Beddoes, Hill, Thornton, and several other physicians and practitioners of medicine, in numerous instances, with most signal success. Dr. Hill used it in practice for more than 25 years; Dr. Thornton was quite eminent for his successful application of it, and indeed I have had the pleasure of conversing with several highly-educated and sensible persons who declare that their lives were saved by the inhalation of oxygen, under his care, some 30 years ago. Dr. Riadore and a few other gentlemen in our profession have used oxygen more recently with successful results. We have amply sufficient facts to support the claim I now make to have this agent admitted into general practice.

The principal point, upon which some of my respected medical brethren have joined issue with me, is the presumed too-rapidly-destructive metamorphosis of tissue when oxygen is employed in exhausting diseases. Others have met me with the strongly-expressed opinion that it "must be an injurious stimulant or excitant to the vascular system;" while in some instances I have heard of the remark, somewhat contemptuously made, "I suppose it is nothing more than taking a little extra fresh air, and can do neither good nor harm." Others, again, conceive that the gas is merely a

temporary stimulant, like alcohol—and that the effects immediately passing off, the patients can have, at least, received no permanent benefit, even if no corresponding depression result. One great misgiving appears largely to prevail, *viz.*, that the inhalation of an increased amount of oxygen must hazard pulmonary inflammation. A physician, eminent in the profession, gravely assured a patient who requested his opinion, that the Almighty had put the right proportion of oxygen into the air we breathe, *ergo* under no circumstances could it be desirable to increase it temporarily. Some content themselves with objecting, “Oh! that is an old-fashioned thing—that has been tried in the hospitals, and always failed.” The most reasonable reply which I have heard, was from the lips of one of our most eminent physicians, who, when his opinion was required, said, “I have never given the subject my consideration; I have never used oxygen in disease, nor seen it used, and therefore I decline to give any opinion on the subject.” The most pertinent question as to the therapeutic use of oxygen is used by the layman, ignorant of medicine, but with a common sense view of our duties to patients, who asks, “Why, if oxygen be a powerful remedy, the effects of which have been known so long, is it not generally used by the medical profession?”

The most remarkable thing connected with these

opinions obviously resides in their contrariety and their variety; nor can I wonder at them, when I recal to mind the words of the late celebrated Dr. Pereira, our great authority on *Materia Medica*, who, fortified I presume by the reported failures in some hospitals, ends his article on the therapeutic use of oxygen in these words, "On the whole, then, I believe oxygen to be almost useless as a remedy."

The above opinions, so characteristically opposed one to another, I will consider *seriatim* in as few words as possible:—

The "too rapid metamorphosis of tissue" appears *prima facie* very plausible; but numerous successful facts in my own experience have clearly proved to me, that in promoting and augmenting for a certain period daily the natural transformations of tissue, we *pro tanto* confer upon the system an increased power of re-construction. The vital powers, which may have been long depressed by disease, unable to get the necessary lift-up to par, and consequently (incapable of renovation by any other available means) becoming weaker daily, will frequently under a judicious exhibition of this powerful remedy at once receive permanent invigoration. Once give the physical forces the urgently-required temporary stimulus, then the almost stagnant circulation resumes its healthy motion, the torpid digestive and assimilative functions again become

active, the congested organs are again capable of their work of secretion and excretion, and by a carefully managed daily dose, conjoined *where necessary* with other judicious assistance, the constitution, after the lapse of a proper period, according to the nature and long or short duration of the malady, becomes entirely renewed, and not only is oxygen as a medicine no longer required, but health being restored, a continuance of it will become absolutely injurious. In all cases, indeed, where there is still existing the smallest amount of intrinsic reconstructive power, even where every other means has been unsuccessfully tried, this therapeutic will rarely fail under experienced direction. In fine, subject to the condition that it be employed with a sufficient *practical* knowledge of its actions, and with due attention to dietetic regulations and other judicious measures, oxygen cannot be productive of too rapid and injurious metamorphosis. The idea of "living too fast," which has been suggested, must by no means be considered as applicable to the medicinal use of oxygen, inasmuch as analogous reasoning would then support the belief that an increased amount of fresh air and exercise must shorten life by promoting immensely the natural transformation and destruction of tissue. Yet do we not all know that health is thus invigorated, and hale old age almost ensured?

As to this remedy proving an injurious stimulant or excitant to the vascular system, I may say that the inexperienced might meet with such a result in certain constitutions; that formerly, before I had fully initiated myself in its application, I occasionally had little *contretemps*, but that with due caution no unpleasant sensation, except of a most evanescent character, need ever arise.

As to its doing neither good nor harm, because merely equivalent to a little more fresh air; such a proposition scarcely merits an allusion. I can readily understand how this should be, if the due absorption of the gas were not ensured; but that the absorption of a potent physiological agent like oxygen should be believed to have no effect of *any consequence* upon the system, could only arise from practical ignorance of the remedy, or from having probably observed no effects follow a few improperly-managed administrations. A fact well ascertained by all careful experimenters that hyper-arterialisation invariably results from the prolonged confinement of animals in oxygen, incontestably proves its potency when inhaled in quantities beyond atmospheric proportion, and affords *per se* the strongest presumptive evidence of its value as a curative agent.

Far from being a merely temporary stimulant, it frequently is not felt as a stimulant or excitant at all. I usually find that sensibly beneficial effects

after inhaling it, last from an hour or two to 24 hours ; and in one lady I recollect well that a single dose produced a feeling of vigor, and what she described as "an elongation of the nerves " for a week or ten days. It may be added, that other powerful medicines are admitted to possess more than a temporary effect. Why should this be denied to oxygen ?

In several thousand instances, and where the oxygen has been inhaled daily for some months, I never met with one indication of inflammation or irritation of the lungs ; but on the contrary, I have had several striking cases of cure in chronic pulmonary congestion (which had been pronounced incurable), as well as in sub-acute inflammation.

Professional differences in opinion and neglect to give a trial, must I believe, have simply originated in a want of lengthened practical experience of oxygen as a therapeutic agent, and from overlooking its influence upon the vital dynamics. Vital air it was formerly denominated ; perhaps that term was by no means a bad one, for it certainly implied much more than chemical action alone. Oxygen is a remedy *suū generis* ; discrimination must be exercised, as to doses and mode of exhibition, in employing it in the treatment of different temperaments and diseased conditions. Under different circumstances in fact, oxygen will be found stimulant, sedative, exciting, depressing ; frequently no sensible effects are felt,

yet gradually and almost imperceptibly a well-marked change for the better takes place in the patient's condition.

The therapeutic application of oxygen, and the prognosis to be formed as to the probabilities of success from its employment, must always be based upon the peculiar pathological state of each individual patient. The proportion of the gas absorbed (when administered in quantities beyond that normally present in the atmosphere) is determined by the surfaces of blood and oxygen which can come into contact in a given time, and also by the amount of elements or compounds in the blood which have a special affinity for oxygen. Now these oxydizable or electro-positive respiratory elements may be in excess, or they may be deficient; in the latter case oxygen may not be absorbed, although presented. Success from its employment, even when suitable cases have been selected, will be found to depend upon judicious directions as to the mode of inhalation, and upon the care with which oxygen is made thoroughly to permeate the delicate membrane of the air-cells. Moreover, I believe we must not confine our views in every instance to the chymical combinations of oxygen in the pulmonary capillaries alone; for I have observed such well-marked and rapid effects upon the circulation in the extremities, in cases where, from

poverty of blood, the gas could only meet with very little oxydizable matter in the lungs, that I feel assured that oxygen, when properly managed, may be made to permeate the general tissues of the body, and so directly enter the systemic as well as the pulmonary capillaries. This need not surprise, for it is well known that few gases are so rapidly absorbed by the organism.

The use of oxygen will give some personal trouble, and cause loss of time to the practitioner, especially in his first essays; but I am sure few members of our profession would permit these considerations to influence them, were they really aware of its value both as a primary and auxiliary medicinal agent.



## CHYMICAL OUTLINE, &c.

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THE essentials to the existence of the animal organism are PONDERABLE MATTER, CHEMICAL ACTIVITY, and VITAL FORCE in the body, and OXYGEN to be inspired.

The ponderable matter of the organized body consists principally of hydrogen, oxygen, nitrogen, chlorine, carbon, sulphur, phosphorus, fluorine, calcium, sodium, potassium, magnesium, iron; always arranged in definite chemical combinations. These are all derived from the blood; the blood derives them from our food; our food has obtained them from the soil, the water, or the atmosphere of the earth which we inhabit. Organic chemistry presents them in the form which we require for use; vital chemistry acting through the functions of our various organs determines the form which they assume while we are using them. Every part of the entire structure and fabric of the body is built up from the ponderable elements of the blood; a great portion of its carbon and hydrogen unites with the oxygen of the atmosphere and causes heat, a first item in chemical activity; chemical

activity is always attended by evolutions of electricity, which plays an important part in the animal economy; chemical action also causes the atoms of matter to assume definite combinations which are necessary for the nutrition of the body, and are also needful when effete matter is to be removed from it—but chemical action is constantly coerced and made the obedient servant of vital force. The means by which vital force causes bone and cartilage, ligament and muscle, nerve and brain, membranes and fat, hair and skin, bile and various other fluids to be secreted from the blood, retained while necessary, and then to become excretions, are, as has already been observed, a vital chemistry transcending our comprehension. We must first be able to know what life is, before we are competent to understand its chemistry. Ponderable matter, electrical and chemical forces are necessary to life, but they are not life—neither is life the simple result of a chemical action, for it coerces chemical action: life is the master, chemical action the servant; life from the first moment of embryonic existence organizes matter; when life ceases, chemical forces no longer coerced, speedily disorganise matter. If we would know what life is, we may as well seek our knowledge from the lips of some well and religiously taught little child, as make our enquiries from the philosopher versed in the laws of material physics;

—Ask the child, “What is life?”—he replies, “Something which God gave me when he made me.” Ask the philosopher the same question, and hear his reply,—“Life is the resultant of all the complex forces which govern and maintain the harmony of the activities and relations of the atoms of an organized being.” If we follow this enquiry to its ultimate, we can at last only arrive at that point where the simple faith of the child-like intellect becomes superior to the most profound deductions of a purely material philosophy.

Although physiology in its connection with chemistry, electricity, and allied sciences, cannot teach us what life is, it does teach us most emphatically that the existence of life depends upon certain material elements and forces which are developed amongst the molecules of these elements.

If we presume or assume that a distinct principle called life is absolutely essential to an organized existence, another principle is equally essential—namely, heat; for the former cannot exist unless in conjunction with the latter. Chemistry teaches us that heat in a living being is always the product of a combination between the hydrogen and carbon in the blood and the oxygen supplied by the atmosphere; some physiologists consider that the *vis vitæ* affords a source of heat distinct from chemical action; however, as no *vis vitæ* can be supported without

oxygen, we have no difficulty in perceiving how essential—how all-important is attention to the respiratory function; how essential—how all-important to our health, our feelings, our existence, is an adequate supply of this element.

As I would rather quote wisely than write without acknowledged authority, let us hear what the celebrated Baron Liebig, the first of organic chemists, teaches on this subject:—

“All the parts of the animal body are produced from a peculiar fluid, circulating in its organism, by virtue of an influence residing in every cell, in every organ, or part of an organ. Physiology teaches that all parts of the body were originally blood; or at least they were brought to the growing organs by means of this fluid.”

“In order to keep up the phenomena of life in animals, certain matters are required, parts of organism, which we call *food* or *nourishment*. In consequence of a series of alterations, they serve either for the increase of the mass (*nutrition*), or for the supply of the matter consumed (*reproduction*).”

“If the first condition of animal life be the assimilation of what is commonly called nourishment, the second is a continual absorption of oxygen from the atmosphere.”

“Viewed as an object of scientific research, animal life exhibits itself in a series of phenomena,

the connection and recurrence of which are determined by the *changes which the food and the oxygen absorbed from the atmosphere* undergo in the organism under the influence of the vital force."

"All vital activity arises from the mutual action of the oxygen of the atmosphere and the elements of the food."

"Waste, in the animal body, is a change in the state, or in the composition of some of its parts, and consequently is the result of chemical actions. The influence of poisons and of remedial agents on the living animal body, evidently shews that the chemical decompositions and combinations in the body, which manifest themselves in the phenomena of vitality, may be increased in intensity by chemical forces of *analogous* character, and retarded or put an end to by those of *opposite* character; and that we are enabled to exercise an influence on every part of an organ by means of substances possessing a well-defined chemical action."

"The first conditions of animal life are nutritious matters and oxygen, introduced into the system."

"At every moment of his life man is taking oxygen into his system, by means of the organs of respiration; no pause is observable while life continues."

"At every moment, with every expiration, certain quantities of its elements separate from the animal

organism, after having entered into combination, within the body, with the oxygen of the atmosphere."

"Since no part of the oxygen taken into the system is again given off in any other form but that of a compound of carbon and hydrogen; since further, in the normal state of health, the carbon and hydrogen given off are replaced by carbon and hydrogen supplied in the food, it is clear that the amount of nourishment required by the animal body for its support, provided its weight is to remain unaltered, must be in a direct ratio to the quantity of oxygen taken into the system."

"An excess of food is incompatible with deficiency in respired oxygen."

"The quantity of oxygen inspired is affected by the temperature and density of the atmosphere."

"The mutual action between the elements of the food and the oxygen conveyed by the circulation of the blood to every part of the body is THE SOURCE OF ANIMAL HEAT."

"All living creatures, whose existence depends on the absorption of oxygen, possess within themselves a source of heat independent of surrounding objects."

"It is only in those parts of the body to which arterial blood, and with it the oxygen absorbed in respiration, is conveyed, that heat is produced. Hair, wool, or feathers do not possess an elevated temperature."

"This high temperature of the animal body, or, as it may be called, disengagement of heat, is uniformly and under all circumstances the result of the combination of a combustible substance with oxygen."

"It is obvious that the amount of heat liberated must increase or diminish with the quantity of oxygen introduced in equal times by respiration."

"The amount of oxygen capable of being taken up in the animal body in a given time is limited by the quantity of oxygen which can come into contact with the blood, and of blood which can come into contact with the oxygen."

"The supply of the waste of matter, and the amount of oxygen taken into the body in a given time, determine, in all seasons, and in all climates, the quantity of food necessary to restore the equilibrium."

"In many diseases substances are produced which are incapable of assimilation. By the mere deprivation of food these substances are removed from the body without leaving a trace behind; their elements have entered into combination with the oxygen of the air."

"From the first moment that the function of the lungs or of the skin is interrupted or disturbed, compounds, rich in carbon, appear in the urine, which acquires a brown colour."

"Over the whole surface of the body oxygen is absorbed, and combines with all the substances which offer no resistance to it."

*"Respiration is the falling weight, the bent spring, which keeps the clock in motion ; the respirations and pulsations are the strokes of the pendulum which regulate it. In our ordinary time-pieces, we know with mathematical accuracy the effect produced on their rate of going, by changes in the length of the pendulum, or in the external temperature. Few, however, have a clear conception of the influence of air and temperature on the health of the human body ; and yet the research into the conditions necessary to keep it in the normal state, is not more difficult than in the case of a clock."*

"The view above developed of the action of oxygen in the animal organism, *cannot be endangered in its truth by the usual relation of oxygen to fat, or to animal matters, out of the body.*"

"In the animal body we recognise as the ultimate cause of all force only one cause, the chemical action which the elements of the food and the oxygen of the air mutually exercise on each other."\*

It cannot be necessary to quote other authorities to shew that oxygen is absolutely as important to life as food ; common sense and experience convince

\* Extracted from the Organic Chemistry of Baron Justus Liebig.



us that we must breathe; physiology teaches the functional use of lungs; chemistry instructs as to the effects of the function and the important necessity of a sufficiency of oxygen as it enters more or less into combination with every atom of our bodies; no atom can be secreted and organised without it; no atom can be disorganised and excreted without it, no heat, no chemical activity, no nervous electricity, no muscular strength, no digestion, no assimilation, no secretion by the liver, no secretion by the kidneys, no secretion in the bowels, no action of the skin, no reproductive powers, no happiness, no anything appertaining to material life is possible unless the presence of oxygen is constant;—the power of appropriating it constant; and the proper balance of oxygen to other elements and of other elements to oxygen preserved.

If physiological chemistry teaches anything at all worthy of reception, it therefore teaches that the FIRST LAW OF HEALTH is ATTENTION TO THE RESPIRATORY FUNCTION, *and to the necessity of maintaining the proper balance of relation between the food and fluids which we swallow and the oxygen which we breathe by our lungs or absorb through the skin.* This leads us to the consideration of these questions:—"Can we have too much oxygen?" "Can we be subjected to a deficient supply of oxygen?" "Do conditions exist which

interfere with the normal action of oxygen on the organism?" "What effects will follow any excess; any deficiency; or interference?"

The blood has a remarkable power of absorbing gases and holding them loosely in combination with its elements; with carbonic acid and oxygen this is especially well marked. It has been shewn by Liebig and Enderlin that its affinity for carbonic acid depends greatly on the presence of alkaline tribasic phosphate of soda;—the cause of its peculiar affinity for oxygen is not so well understood, but it is clearly ascertained that it has relation to the quantity of iron associated with the red blood corpuscule. Every reduction of this quantity below the normal standard is evidenced by want of general tone, languid circulation at the extremities, debilitated functional power, and various ailments as a consequence. Where these conditions are found existing analysis of the blood has proved the iron deficient to the extent of 30 or 40 per cent. in many cases.

Iron in the *Materia Medica* is classed as tonic. A tonic is merely a medicine intended to increase the strength and functional vigour; the iron, it is presumed, accomplishes this by imparting to the blood an increased power of taking up oxygen? The true tonic is the oxygen. Iron in some one or other of its forms is a most useful and efficient

tonic, but in many cases it fails to act as a tonic, and also distresses the patient. The cause of its failure may in many instances be traced to deficient supply of oxygen, for unless the physician increases the oxygen while prescribing iron, he may order that which can do no good, and even becomes a detrimental incumbrance to the stomach, bowels, some of the organic viscera, and general circulation.\*

Oxygen gas may be "too much" whenever the food digested and assimilated by the patient does not supply the necessary proportion of hydrogen and carbon to enter into combination with it. The balance of relation between oxydizable food assimilated and oxygen inspired not being maintained, waste of substance will be the result; and the patient will "lose flesh."

"Can we neglect to receive enough oxygen?"—Undoubtedly we can, and it is easy to shew that we most undeniably, in many cases, do; that the lungs

\* Physiologists do not know all the uses of the iron in the blood. As oxygen is electrically negative to every other element in the organised system it is reasonable to infer that electricity is constantly evolved by every change of combination which it makes; the iron is very probably a conductor of electricity; or its atoms become polarised and induce electrical currents in the nerves. In the succeeding chapter, containing a few remarks on the "Vital Dynamics," this point will be again referred to.

and skin do not receive the proportion which is absolutely necessary for health. The requisite proportion for our well-being is doubtless supplied by the Divine Author of all existence in our atmosphere, but our conventional and artificial habits deprive us of the power of appropriating the requisite supply. I may instance the mode of life which prevails amongst literary and professional men, in mercantile and business life, amongst those who spend much of their time in the great arena of politics, or in the crowded assemblies, theatres, luxurious apartments, and habits of fashionable society. The legislator, the student of literature, of theology, of law, of science, works with his head, but does not use his muscles: he does not work hard with his lungs; he does not "pant" with the performance of his laborious task; the sunshine of his hours of relaxation from professional toil emanates from the gas burner; the air which he then breathes holds a large excess of carbonic acid (deadly poison for the lungs and blood) and is considerably deficient in the necessary volume of oxygen; he burns his "midnight oil" in his study-lamp, but he never burns the mid-day oil or the midnight oil of his blood completely. While his health is not seriously impaired, he is usually doing his worst speedily to impair it; if he enjoys the pleasures of the table, rich food, strong

wine, and alcoholic stimulants are a part of his daily fare; he pours oil into his vital lamp, but he never burns it all. What are the effects of this neglect?—torpid bowels; impaired digestion;—diabetic disease of the kidneys; enlarged spleen; redundancy of bile;—congestion of liver and other organs; rheumatic and gouty secretions in the blood causing rheumatic or gouty inflammation, deposits, and concretions in some of the tissues. Again, want of oxygen acts on the nervous vitality; he neglects the furnace which should generate vital steam for his organic machine; when the fire does not burn enough the steam is not generated sufficiently and the working of the machine is weakened by deficiency of moving power; then we see paralysis, loss of functional tone, spinal disease, head-aches, want of appetite, want of sleep, want of power or desire to do anything, hypochondriasis;—we see disease in some of these, or some analogous forms, ending in death or a prolonged life of suffering!—little else but suffering. This is absolutely the condition of a large portion of society, either attained or in a fair course of being attained. What can the physician do?—if he points out the evil the patient insists that he cannot help it; he will do as he is doing until a broken constitution and health lost, render him incapable of continuing his habits. What can the physician do but apply

remedies to correct the most prominent functional derangements; nevertheless as the root of the evil is in the respiratory function, and there being no drug to increase vitality if vital oxygen be not supplied—the physician ends by sending his patient into the country to try pure air and change of habits. Country air in these cases meaning more oxygen for the lungs; change of habits, exercise and circumstances which enable the patient to appropriate it.

With patients who are in the position described, I can decidedly state that an artificially increased supply of oxygen, in the necessary absence of country air and exercise, may be most beneficially employed not only as a compensating remedy for prejudicial conventional habits, but that it may be usefully administered as a medicine to repair the mischief which has already been caused by these habits. I believe that as the lungs exercised in pure country air only inspire that amount of oxygen which is necessary to maintain the health of those who are in sound health, those who have impaired their health by a continued deprivation of oxygen, may greatly facilitate their recovery by taking oxygen in excess of the natural proportion supplied by the atmosphere.

Many of the habits which prevail amongst the “gentler sex” in the upper classes of society and their conventional style of education in early life,

where the brain is constantly overtasked and the muscles and lungs undertasked, where the body is viewed as a talking machine rather than a walking machine, are especially prejudicial to the respiratory function;—it can hardly be otherwise than that suffering from a deficiency of respired oxygen should ensue. All authorities will agree that the latent seeds of consumption are too frequently developed in the youthful and delicate by errors of education.

There are numbers to be found in all classes who, from not knowing the evil consequences which follow, accustom themselves to maintain positions exceedingly detrimental to the due performance of the respiratory function. Ladies spending their time on fancy work, reading with their books on their knees, writing at low tables with their eyes too near the paper, and in many other ways bringing their shoulders forward and preventing the proper descent of the diaphragm, diminish the natural capacity of the lungs by offering an impediment to their expansion. I may also allude to the wearing of tightly-laced stays. Gentlemen who spend many hours at the desk, and many artizans (as shoemakers for instance) do more or less the same. Whatsoever the nature of the habit may be, the truth is forcibly evident that its effect is detrimental by

causing a contracted chest which prevents the lungs receiving a due supply of oxygen, and that constitutional debility, derangement of function, consumption, or some disease of structure must ultimately be the consequence.

Amongst the working classes in large towns, where the habits of life are not merely conventional but the result of necessity, we may easily perceive suffering clearly to be traced as the result of defective ventilation, sleeping in small crowded rooms, eating in crowded rooms, often working in crowded rooms; rooms in which excess of carbonic acid and decrease of the natural proportion of oxygen prevails—there can be no doubt that these classes suffer from deficiency of vital oxygen.

In order to obtain a proper supply of oxygen from the atmosphere, exercise in pure air is necessary. Exercise accelerates the circulation, causing more blood to pass through the lungs in a given time, exercise also makes the subject take more frequent and full inspirations; thus the increased supply of blood through the lungs obtains an increased supply of oxygen; more heat is generated in the system, vital and chemical changes are more actively developed, transformation of tissues and excretion of waste matter is increased, more food is necessarily consumed, and a more perfect state of health is attained. But exercise in pure air



implies a certain amount of physical strength and access to pure air. There are thousands of invalids suffering from chronic diseases who are totally unable to take any suitable open air exercise, being confined to their chambers; in such cases as the patient cannot go to the oxygen, it is quite rational for the physician to insist that the oxygen be brought to his patient.

In acute diseases especially the condition and circumstances of the patient are frequently such as to preclude a normal supply of oxygen for the due action of the respiratory function. We need not ask if he gets enough oxygen, for we may be sure he does not, and cannot unless art or science provide some means of making artificial compensation for circumstances.

The writer presumes that sufficient reason has been adduced to shew plainly that many circumstances and conditions exist which interfere with the *normal and necessary balance of oxygen and food in the organism*; that deranged functions and diseases are the result, and that AN INCREASED SUPPLY OF OXYGEN, THEREFORE, AFFORDS A DIRECT AND SCIENTIFIC METHOD OF APPLYING THE NEEDFUL REMEDY.

## RELATION OF OXYGEN TO VITAL DYNAMICS.

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“Vital force,” “vitality,” “*vis vitæ*,” terms frequently employed, readily admit of two significations, distinct one from the other. Life in its highest sense, is an emanation (incomprehensible to ourselves, because beyond our finite thoughts) from the omnipresent Creator of the universe, pervading every organised body in varied but definite proportions, and preserving the harmony of the natural laws to which we are subjected. This controlling power—this emanation from the Deity, keeps all in order from the simple developing cell (the commencement or starting point of all organisation) to the body as a whole; it regulates the movements of all that delicate, beautifully adapted, and complicated machinery, upon the exact mutual co-operation of each and every part of which organic existence depends. From man, the highest and most perfect of God’s works, through the animal

kingdom down to the zoophite class linking animal and vegetable life;—through the higher classes of vegetable organisation down to the lowest orders where the doubt arises whether we are still dealing with life or whether we have entered the mineral kingdom; everywhere throughout nature we see depicted higher or lower grades of intrinsic “vital power,” which, with undeviating accuracy organise matter, and preserve organisation by certain currents of force or arrangements given to the otherwise inorganic atoms. Again, we observe that life in the different classes of organised existence has its fixed or determined period. Man, *cæteris paribus*, lives from 70 to 100 years, rarely beyond; the horse between 20 and 30 years; some insects from birth to death but 24 hours. The oak has *vis vitæ* for several hundred years, but at length must decay and die; many of our favourite garden flowers enjoy but a few months’ existence. As it prevails throughout nature, so does it obtain with man. A minute germ—a cell—by this intrinsic “*vis vitæ*,” is developed into the foetus, the foetus into the infant, the infant into the youth, the youth into mature age—then comes the descent in the vital scale, until the decay of old age is reached. The duration of life is fixed by irrevocable decree; unchangeable, excepting by a special permission of Providence.

This is life in its highest acceptation, as it must

be acknowledged by every physiologist who can view organisation as dependent on the fiat of a Divine Creator; but the word "vitality," or "vital force," admits of another interpretation, and conveys the idea of a power, existing in association with organised matter, which appears to be generated by certain arrangements of and motions amongst its alternate molecules. Life, in its highest form, is above all material forces; life, in its secondary acceptation, exists as a consequence of electrical and chemical or electro-chemical action constantly developed in vitalised matter. It is with life in this, its secondary form, that the physician is especially connected.

However valuable the chemical researches by which we have learnt the nature of chemical action in the organism, yet we must by no means permit our high appreciation or admiration of them to confine our attention to merely chemical facts; let the causes and the results of chemical action be carefully considered in connexion with electricity and magnetism, and it will then be acknowledged that oxygen (which I am specially regarding) possesses a far higher control over the organisation than that which is purely chemical—that it should be viewed not alone as a chemical agent but in relation to the entire vital dynamics.

Science shews that no chemical action can take

place without the evolution of electricity, or without evidence of considerable electrical disturbance. Certain phenomena, under varying aspects, demonstrate themselves throughout nature, *viz*:—those to which have been applied the terms electricity, magnetism, electro-magnetism, to which may be added light, heat, motion, and chemical action, all probably derivatives of a single force. We learn from Professors Faraday, Graham, and others, that there are certain definite movements of matter during electrical action—movements resulting from the state named *polarity*, a term borrowed from the phenomena of electro-magnetism; the idea involved being that electrical induction causes the opposite sides of atoms to acquire opposite properties identical with those which belong to the two ends of a magnet; this polarity induced in one atom going indefinitely from atom to atom. During the continuance of this current (as it is called) the polarity is being continually lost and restored—lost by combination of opposite polarities, restored by their re-formation.

Many of the phenomena constantly manifesting themselves in the human body appear capable of philosophical explanation through the analogy of the Leyden jar. Let us suppose, with Professor Graham, “that the ultimate atoms of a metallic mass are under the influence of chemical affinities,

being in a state of chemical combination one with another, and not isolated and independent of one another like loose grains of sand ;” and we may comprehend how the charge is preserved in the jar by the mechanical interposition of glass between the excited coatings presenting a barrier to the reunion of those polar elements in the metallic coatings which have been separated by the current, and through whose separation and reunion the current takes place. Thus may be solved the difficulty of magnetic permanency, as well as the preservation of an electrical charge up to a certain point of intensity.

The use of the iron in the blood appears to be a point of great importance which has not been sufficiently examined. By the above supposition (as a scientific writer suggests), in the loadstone and in steel, oxygen and carbon apparently act the part of the glass, the magnetism being rendered permanent, simply because these substances present a mechanical barrier to the reunion of the polar molecules of the iron. Iron very readily enters into the electrical state, and as readily passes out, the elements of its molecules being peculiarly mobile. The loadstone may thus become the key to the mystery of electrical action ;—*i.e.*, we have a mechanical medium interposed between the polar elements of the molecules, sufficient to prevent their reunion,

but not to prevent their mutual reaction. Similarly does it obtain with the magnetic oxide of iron. May not the iron in the blood have been selected for its destined work, as eminently possessing powerful magnetic qualities?—peculiarly adapted as it likewise is for forming the essential metallic constituent of the blood-corpuscles, the great oxygen carriers. To continue the analogy of the Leyden jar as applicable to the corporeal organism. I may quote Dr. Carpenter, who beautifully suggests "That the contraction of any muscle upon the application of a stimulus must be attributed to an exercise of vital force engendered by previous acts of nutrition. The stimulus is not the source of the force, but only supplies some condition which is requisite for its manifestation; just as the application of the discharger to the Leyden jar, (charged by the previous action of the electrical machine) liberates, so to speak, its pent-up electricity, and allows this to display itself as an active force. Now just as the jar may be so charged with electricity as to discharge itself spontaneously, so is it easy to conceive that a muscle may be so charged with motility (motor force) as to execute spontaneous contractions; and of the existence of such a condition we have valid evidence." Dr. C. then instances the action of the uterus in the local contractions frequent during the later months of ges-

tation, as well as in the final parturient effort, and also the rythmical movements of the heart, as due to a simple excess continually supplied by the nutritive operations, and as constantly discharging itself in contractile action.

The investigations of Oërsted, Matteucci, Dubois Reymond, Smee, and others, as likewise of Reichenbach and Leger,\* collectively afford us the means of gaining much useful knowledge in respect to this difficult yet most interesting subject—a *point d'appui* from which I believe, the physician may more clearly comprehend therapeutic action. Difficult of course is it to explain all *the laws which regulate* the physical forces, because there does not exist a sufficient acquaintance either with them or their conditions; the latest scientific discoveries, however, in their totality, afford very good evidence of the following.

No two parts of the body (excepting those which correspond on the opposite sides) are precisely in the same electrical condition, and such conditions are constantly in a state of change, while the differences between them are greater in proportion to the diversity of the vital processes which are taking

\* Any readers who may be desirous of fully going into these matters are recommended to study the writings of the above; in naming whom I must expressly beg to be understood, as by no means giving in my adhesion to *the whole* of the views of the two latter.



place in them, and to the activity with which they are carried on.

The body is constantly undergoing molecular changes more or less rapid, attended with more or less powerful electrical currents; and experiments upon the relative electrical states of different parts of muscle and nerve, (currents existing in both) with the magneto-electrometer, have proved that the processes of nutrition and secretion in parts, which are rapidly being subjected to molecular change, give rise to electrical currents.

The blood and the muscles have been shown to be in opposite electrical conditions, so likewise the skin and most of the internal membranes, and since these effects are found to *cease* after *the death* of animals, they cannot consequently be attributed to simple chemical differences between the parts.

Further, it has been beautifully, and to many eminently philosophical minds satisfactorily, demonstrated, that man (and of course all animals) possess inherent electricity which is generated, not derived; and since so-called magnetic currents must ever be present where electrical currents exist, the term magneto-electrical would appear the most appropriate one.\*

\* To the odylie force of Baron Reichenbach, I purposely avoid any special reference. The question is *sub-judice*, and I should not wish to commit myself to a decided opinion—I will merely remark, that I am somewhat inclined to think that this "odyle" is simply a manifestation of universal physical force.

As all processes of nutrition and secretion, or of disintegration and excretion, are dependant on the access and presence of oxygen as one prime factor—the electrical currents being generated during the progress of these vital actions—the necessity of oxygen to maintain normal physical action, both as a chemical agent and in a less obvious, but more wonderful way, as a generator of magnetic or electrical force, becomes most earnestly impressed on the physiologist.

In the living body series of changes are constantly proceeding which are immediately dependant on electrical conditions, and the medicinal efficacy or action of many substances arises from their ability to modify, alter, or change these conditions; *ergo*, their medicinal action is rather electrical than chemical.

In considering the magneto-electrical relations of the organism, a most remarkable point to which every reflecting mind must turn, is the duality of the body; that is, its division into symmetrical halves, and the wonderful harmony\* existing between the cerebro-spinal or voluntary portion of the nervous system, and the sympathetic or involuntary series of nervous arrangements. We find a series of nervous centres (animal magneto-electric

\* In magnetometric experiments we must be struck with the curious and interesting fact of *corresponding lateral portions* of the body being the only parts where different localities evidence electrical influence of a precisely similar character.

batteries?) in each of the two great nervous divisions, connected together by a number of nerves (conducting wires?), and sending forth branches which minutely subdivide and interlace in every, even the smallest, point of the body. The cerebro-spinal presides over motion and sensation, the sympathetic over the intuitive and formative functions, linked together in one most intricate yet harmonious whole, and forming continuous magneto-electric circuits.\*

With respect to medicines and their actions, although chemistry may enable us to determine the peculiar arrangement of atoms with which a particular medicinal action, or the active principle of a medicine, is associated—it does not, nor can it inform why that medicine has a special influence on some part of the system; why, for instance, belladonna is specially directed towards the iris, or rather the nerves supplying it—mercury to the liver;—why arsenic and aloes, even when absorbed by the skin, demonstrate their affinity for the nerves supplying, in the one case, the mucous membrane of the throat, stomach, and eyelids, in the other, the colon;—while diuretics and diaphoretics, such as ipecacuhana and digitalis respectively are unerringly directed to certain fixed channels of exit.

\* I have used the ordinary verbiage in designating the two great nervous divisions, but it would be a much happier course to adopt the terms proposed by the late lamented Dr. Marshall Hall, *viz.*, *excito-motory* and *excito-secretory*.

Again, in the body we see currents of force acting in a special and defined manner,—we see the urea impelled or directed to the kidneys; bile secreted by the liver; cholesterine formed and appropriated as a constituent of nervous substance itself; we see various analogous actions constantly maintained; but we cannot call the force which directs a certain compound of atoms to a special organ chemical force. Chemistry can only acquaint us with the nature of bile, urea, &c. As in these instances, so is it throughout the body; there are unceasing series of metamorphoses, of decay, of re-constructions, different atoms taking definite directions with unerring accuracy and forming the numerous products necessary for life simultaneously with the ejection from the system of effete matters, but these actions are due to vital dynamics, although they necessarily involve chemical changes.

With these views as to the electrical forces and polar conditions of the vital organization—we may arrive at a tolerably safe conclusion, that the whole bodily functions are specially influenced by magneto-electric currents; that the brain and the other nervous centres are the batteries where the power is accumulated; and that the *electro-positives* supplied to the blood by the ingesta, and the *electro-negative oxygen* absorbed from the atmosphere, are the elements by which the magneto-electrical power is generated.

REMARKS UPON DISEASE  
IN CONNECTION WITH THE  
THERAPEUTIC POWER OF OXYGEN.

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IN employing ordinary medical parlance to designate different classes of disease, I must give expression to my strong opinion that we cannot too soon eradicate the common error of treating by arbitrary routine the mere nomenclature of disease. A few links in the chain of morbid actions being observed, a name has been given with the laudable intention of conveying the totality by a simple expression. I believe that this classification of ideas, promulgated by the great Dr. Cullen and his followers, has been conducive to many errors in the practice of medicine; leading us not only to extend and amplify unduly our nomenclature of diseases, but likewise so to increase the number of our remedies that the intentions of nature and the primitive simplicity of her laws are almost over-looked in a chaos of scientific experiments. By constantly observing

a chain of symptoms, giving it name, and then treating in accordance with certain routine formulæ, the professional mind has been sometimes led to observe effects and disregard causes ;—and thus many of our most approved remedies are open to the charge of being rather palliative than curative.

This system, which has engrafted itself on the practice of medicine, has called forth reprobation from many master minds, and has elicited these sarcastic remarks from Sir John Forbes :—" Since the medical art assumed its present formal, bold, and complicated character, it is only in very rare or exceptional cases that the disease is left to nature, or treated merely regiminally. On the contrary the strongest and most effective powers of art are usually employed for the very purpose of setting aside, or counteracting, or modifying in some way or other the powers of nature. Generally speaking we may even say that all the heroic arms of physic are invoked purposely to disturb and obstruct and overwhelm the normal order of the natural processes." Although the tone in which these remarks are conveyed is not to be admired, we cannot say that they are altogether devoid of truth ; this truth, perhaps, might have been rendered more palatable to the professional taste without injuring its effect as a medicine applied to the professional disease.

To a certain extent the majority of the profession will endorse this opinion of Sir John Forbes. There are few, excepting young men just evolved from their medical schools, (to whom experience has not yet brought knowledge,) who do not wish to see medical practice reduced to more simple principles and less complicated remedies; to see nature trusted to more and art less;—and it is with this view that an increase of oxygen—nature's own remedy—acting in her own way, is now advocated in disease.

Let me repeat that oxygen gas must on no account be regarded as an universal panacea;—there are many cases where its employment as a remedy is contra-indicated; but it may be confidently asserted, as the result of *practical experience*, (which in medical art especially must outweigh all theories,) that it is applicable to a very large number of diseases which by their nosology appertain to widely distinct classes; this being the fact, one conclusion is evident, that in these cases the classification has reference merely to symptoms or observed effects, and that the symptoms and effects must have one common factor operating as cause. This common factor I believe to be a disturbance of the balance of relation between the electro-positives in the blood and the great electro-negative supplied by our

atmosphere;— a disturbance which impairs the vital dynamical harmony on which all integrity of function depends; and also deranges the chemical transformations in the organism, interfering with normal secretion and excretion, and causing morbid processes and products to interrupt the natural condition designed as the law of our existence.

These premises on ill-health (otherwise disease) being laid down, a few remarks must be specially made upon some of the more important modes in which nature, interfered with or trifled with, evidences a sense of her wrongs.

FUNCTIONAL DERANGEMENTS OF STOMACH AND  
LIVER, WITH INDIGESTION, MAL-ASSIMILATION,  
AND THEIR CONSEQUENCES.

These affections (minus the results of ebriety), are far more common among the higher and middle classes than among the lower, and this obtains to an infinitely greater extent in town than in country. The reason is obvious. In town both ladies and gentlemen lead a much more sedentary life, while at the same time they indulge more in the luxuries of the table, keep late hours, sit in close and heated rooms at home, or frequent badly ventilated places of public resort, where large masses of human beings are crowded within a comparatively



limited area, covered by one roof, with a diminution of oxygen and an increase of carbonic acid gas in the atmosphere. Persistence in one or all of these habits is quite incompatible with the health of the digestive and respiratory functions, and inevitably causes some of the following symptoms which occur in every variety of combination : languor, lowness of spirits, head-ache, heart-burn, acrid eructations, sense of oppression, weight, or distension across the lower part of the chest and upper part of the stomach ; flatulence, constipation, sudden giddiness, temporary loss of vision, sparks in the eyes, noises in the head or ears ; dryness or stickiness of the tongue, especially upon rising in the morning ; palpitation of the heart ; pain in or between the shoulders ; difficulty in taking a deep breath ; neuralgic pains in the face, chest, stomach, or about the region of the heart ; lastly, hæmorrhoids may be named as very common, arising from a congested state of the large abdominal veins and consequently of the liver ; in females the uterine functions are very frequently deranged, and the organs connected therewith subjected to various well-known disagreeable, debilitating, and sometimes acutely painful forms of disease.

Now in each and all the symptoms enumerated two simultaneous actions must be mutually co-operating to produce ill-health ; the positive one of

over burdening the system with alimentary matters, the negative one of neglecting the healthy pulmonary expansion. Either action may be the primary cause, but both will subsequently, as a rule, act in concert; granting the exception, where the former is in a great degree neutralised by a large amount of daily vigorous exercise. Yet, in the majority of cases, especially with ladies, a sufficiency of out-door exercise is not taken, either from indolence, a dislike of trouble, or from a constant sensation of depression and langour giving rise to actual inability. And what is the inevitable consequence? Exercise for a certain time daily is necessary to elicit *complete* expansion of the air-cells, and thus to procure a requisite quantity of oxygen, as well as to induce in the whole of the internal organs increased activity of function through the deeper and more frequent descending and ascending movements of the diaphragm. Let ordinary exercise be neglected, and a necessary result must be that the individual cannot digest and convert into nutriment even a natural and necessary proportion of food, inasmuch as pulmonary inactivity must cause a deficiency of the vitalising element oxygen. Thus we have both an insufficiency of healthy nutritive products to meet oxygen in the lungs, and likewise an extremely limited supply of the gas to meet the already deteriorated blood; and it needs no argument

to show that a low condition of vitality must be engendered, the subjects of which will never feel well and strong, and will become obnoxious to dangerous attacks of disease from very slight causes which ought ordinarily to produce a mere passing effect. Dyspepsia, chronic gastritis, torpor and congestion of the liver, leucorrhœa, or other functional derangements are at first often, at length constantly, giving trouble and being treated medicinally with now and then a temporary resort to country-air. Palliation is afforded, but again and again the same unhappy state of things recur, until at length more formidable forms of malady appear (*e. g.*) gastric and bilious fevers, induration and enlargement, &c., of the liver, spleen, kidneys, uterus, with the by no means rare accompaniment, congestion of the brain and portions of the spine. A much larger amount of disease, than it is the fashion to admit, thus owes its causation.

With regard to affections more immediately connected with the liver, I ought not to omit mention of the fearful cases frequently met with in Europeans returning from India, where we find that organ enormously increased in size, with or without dysentery; many such cases occur when the most eminent practitioners both in India and at home, confess their inability to do more than palliate, and therefore pronounce the patient incurable.

A knowledge of chemical pathology and of the circumstances in which Europeans in India are placed, will enable us easily to ascertain a principal cause of the liver diseases to which they are subject. The natives are not as a rule afflicted especially by disease of liver, while a large portion of the white residents are. The cause depends on the difference in their mode of living, particularly as to diet. The European takes with him his European habits: he consumes animal food whenever he can obtain it presented in a palatable form, in much larger quantity than is required by the native Indian: he drinks often to excess of beer and alcoholic stimulants. He overloads his blood with carbon and hydrogen, and lives in an atmosphere the oxygen of every inspired volume of which is reduced far below the European standard by the expansion consequent upon the excessively high temperature. Thus he continually violates that important law of health—the maintenance of the proper balance of relation between the hydro-carbons taken into the blood and the oxygen necessary to consume them taken into the lungs. When the lungs cannot do their necessary work in the animal economy some other organ is over-tasked in the endeavour to repair the mischief which ensues, and in a majority of cases this organ is the liver. I do not say that this is the only cause, but believe it is perfectly consistent

with science to adduce it as the principal cause of Indian liver diseases.

When derangement of stomach or liver, or both, has become chronic,—when the neglect to inspire sufficient oxygen becomes habitual,—when in consequence the respiratory elements and waste tissues are not properly oxydized and eliminated, a series of effects are produced, which we may recognise as different forms of disease with one causation. To primary affections of stomach, liver, &c., may almost invariably be traced gout, calculous affections, diabetes, morbid deposits, skin diseases, and a whole legion of nervous affections. Some of these we all know to be very intractable; indeed in many instances incurable by the administration of ordinary remedies; but experience having shown me that marked success attends the use of oxygen (in conjunction, *when needed*, with other appropriate medicine), I am fortified in my opinion that a deficiency of oxygen has been the primary cause of these diseases. I will select one form of disease, diabetes—and endeavour to show how this view may be found applicable.

#### DIABETES.

The beautiful discovery of M. Bernard, proving the sugar-forming function of the liver, has lately received further elucidation by the interesting

investigations of Dr. Owen Rees and Dr. Pavy. They have clearly shown that the healthy hepatic sugar differs from that of true diabetes and from grape-sugar in the greater facility with which it undergoes destruction by contact with animal tissue. After some able argument upon the theories respecting this malady, Dr. Rees says, "These results then, taken together, render it probable that we are to look for the cause of diabetes mellitus in a disturbed state of the hepatic function, not in an increase of *natural* action, but in an action varying in *kind*. We see that in health the liver would reduce proximate animal principles to a normal hepatic sugar, and in the perversion of force occurring in diabetes, we have a product given us approaching in character to the normal sugar, but by no means identical with it." He then refers to a point overlooked by physiologists, *viz.*, the distribution of the ultimate fibrillæ of the sympathetic nerves over parts possessing an alkaline reaction, while the case is precisely opposite with the cerebro-spinal nervous extremities, which lie in muscular fibre and in the skin, and are bathed in strongly acid secretion; and then with special reference to the intimate and complicated connexion of the semilunar ganglia and splanchnic nerves with the cerebro-spinal system, Dr. Rees proceeds, "There is no part of the organism to

which we can point in which these chymical opposites are so freely interwoven as in the neighbourhood of the liver and stomach"—and ends by suggesting an "electro-chymical" derangement, and calling attention to "the great nervous centre of the sympathetic" in all diabetic cases.

It would appear further from the experiments of M. Bernard and others, that the sugar formed in the liver passes into the vena cava, to the right side of the heart, and thence to the lungs, in its passage through which it usually disappears, probably by combining with oxygen and forming carbonic acid and water. Dr. C. J. B. Williams thus alludes to this:—"In case of the respiratory function being impaired, as from injury to the floor of the fourth ventricle or to the medulla oblongata, the sugar then is not consumed in the lungs, but passes into the general circulation and appears in the urine. It is possible then that the sugar of diabetes may arise either from an excess formed by the digestive organs and liver, or by an interruption to the process by which the sugar so formed is usually consumed in the lungs."

Now the temporary presence of sugar in the urine, as Dr. Bence Jones and others have shown, is by no means so uncommon as formerly was supposed; and I am well aware that the cases in which it has been most frequently noticed in small quantity,

have been where there existed some inactivity of respiratory function, as in phthisis, in pulmonary emphysema, in asthma in aged persons. We all well know, likewise, how common a thing it is for diabetes and phthisis to be associated.

From the foregoing remarks we can scarcely fail to direct our attention to the respiratory function as a most important point in considering the pathology and treatment of diabetes, and I am inclined to believe that few if any cases of diabetes occur without previous respiratory neglect.\* And since, in cases where exercise, fresh air, and medical treatment under some of the most eminent of the profession had entirely failed, I have found benefit most decided, even in a few days, from giving a proper increase of oxygen, I cannot but draw attention to the fact, and suggest its judicious employment as at least an auxiliary measure, presenting in many cases the only possible means of restoring what I conceive to be the peculiar loss of equilibrium and tone in the central batteries of the sympathetic, from which had resulted the faulty metamorphic action in the saccharine elements; and affording through increased pulmonary activity, the power of due transformation, systemic employment, and elimination of the superabundant sugar.

\* As Dr. C. R. Hall says, it imports not so much what a person can inspire, but what he does.



## GOUT, CHRONIC RHEUMATISM, CALCULOUS AFFECTIONS OF KIDNEY AND BLADDER.

A few observations on these derangements of the animal economy, will appropriately follow those of the chylopoietic and secondary assimilating organs, inasmuch as functional disorders of the latter almost invariably originate the former in their numerous varieties. The proximate cause of these diseases is acknowledged to be an abnormally increased production and retention in the system of certain excretory substances, *viz.*, lithic (otherwise uric) acid and its salts to which may be added in many cases lactic acid. This lactic acid appears from the latest discoveries in organic chymistry to be the last stage of metamorphosis in the starchy and saccharine matter previous to their passage out of the body as carbonic acid and water, and any suspension of healthy oxygenation must obviously retain this acid in the system, and then frequently cause much disturbance in order to restore suspended oxygenation and excretion. Acute rheumatism may be regarded as the most remarkable example, but there can be little doubt that many less noticed and apparently foreign derangements occur from the same cause.

The skin being the great emunctory of this acid, we may *à priori* perceive that every interference with its healthy action must necessarily cause more or less constitutional derangement, depending on

duration of suspended action, as well as on constitutional predisposition and capacity in the organism to overcome injurious impressions. How common is it to meet with colic, diarrhoea, mucous congestion and inflammation of the kidneys or the lungs, as the result of a chill—a check to cutaneous action. Other organs have too much labour pressed upon them to compensate for deficient oxygenation of the lactic acid, and its passage from the surface as carbonic acid and water; added to which considerable accumulation of non-oxygenated excretions, augmented vicariously, may take place. If the due metamorphosis of lactic acid and its cutaneous transit be thus prevented, we must have its elements thrown back upon the system, and relatively to the close association and sympathy between any special locality on the surface, and any viscous or portion of mucous or serous membrane, through the presiding central nervous batteries, we may have various local congestions following compensatory increase of local action. When we reflect upon the quantity of lactic acid which may be thrown back upon the system (if acute rheumatism do not occur) and upon the irritation caused invariably by too great acidity in the intestinal tube,—when we reflect upon the facility with which the lactic passes into the butyric fermentation, how the viscous fermentation may be conjoined—and how these fer-

mentations may be greatly increased by the augmented secretion of —how mucus foetid gasesare thus generated—we certainly cannot be surprised at the severe affections hence originated. Equilibrium in the organic processes being lost, treatment should be directed to assist nature in restoring the due balance of the nervous system and organic forces;—with this view, when long-continued derangement has resisted all ordinary means, the effect of an increased temporary supply of oxygen ought to be fairly tried.

Uric acid has perhaps even more extensive relation to disease than lactic acid, the latter being rather regarded physiologically, the former pathologically. Until the days of Dr. Prout, this acid appears to have attracted but little attention, and, notwithstanding the able writings and investigations of Baron Liebig, Drs. Golding Bird, Bence Jones, Gairdner, and Owen Rees, it is still by no means uncommon to meet with cases previously unsuspected of an immediate uric-acid origin, which, nevertheless, on close comparison of the history, progress, and totality of symptoms, have their true cause clearly indicated.

Lithiasis, as has been suggested, appears a very appropriate general term, significant of the proximate cause of a variety of diseased conditions, traceable to abnormal uric acid formation and

retention in the system. With regard to calculous affections of the kidney and bladder, chymists have for some years shown the close relationship between the uric and oxalic acid diatheses; and formulæ have been given to prove the facility with which the elements of uric acid may be converted into those of oxalic acid and urea by oxygen and the elements of water. Dr. Owen Rees, however, has lately still further elucidated, and at the same time greatly simplified this subject. He has shown that by merely heating specimens of urine highly charged with lithates, we can always produce abundance of oxalate of lime, where none of the latter had previously existed, and that urate of ammonia being in excess, oxalate of lime is formed by the decomposition of the calcareous salts present. Dr. Rees has also very clearly argued that the different phosphatic deposits are purely the result of previous irritation of the mucous membrane by uric acid, and that the phosphatic diathesis of Drs. Prout and Bird is an error. Thus, since the other forms of urinary calculi are extremely rare and may *possibly* depend upon the same cause, lithiasis (or uriasis) becomes of primary importance in treating most chronic affections of the kidney and bladder.

Gout and rheumatic-gout are terms employed to designate a diversity of form in which lithiasis infects the animal economy; and here it may be

added that the writer has met with many instances in which this gouty origin has been quite overlooked, and this has led him to believe that an extension of knowledge on this point is much needed. The following are the principal forms which have come under his notice,—deep-seated local periostitis with or without caries; general and local neuralgic affections, as cephalic, facial, diaphragmatic, pericardiac, enteritic; also severe acute and chronic inflammations resulting from such nervous irritation, in all probability primarily excited by minute deposits of uric acid or urate of soda—the nuclei of subsequent more extensive deposits.

It has been shown that the lithiasis results from arrested transformation of effete matters, which in health are continually undergoing complete metamorphosis and ejected from the system as urea and carbonic acid. What are the previous causes in operation to produce this derangement? Foregoing remarks upon functional affections of the stomach and liver explain how the vast majority of secondary ailments owe their origin to habitual interference with the laws of nature, from over-eating drinking and sleeping, too little exercise, late hours, and confinement in close ill-ventilated apartments or crowded rooms. The system invariably suffers from indolent luxurious irregular habits, and this will especially hold good where

a predisposition to uric acid disease exists. While on the one hand it becomes over-burdened with alimentary substances (the electro-positive elements), on the other, at the very time when a vast increase of oxygen (the great electro-negative element) is urgently needed, this gas actually enters the system in far less than an ordinary quantity; for neglect of exercise entails a diminution in the depth and frequency of respiration, as well as muscular torpor.\* Thus the natural balance between the food and atmospheric oxygen being lost, and the capillary cutaneous circulation becoming also torpid, the mischief is further augmented by accumulations of hydro-carbonaceous *débris* which ought naturally to obtain an exit by cutaneous transpiration. As Liebig affirms, all the oxygen taken into the system being appropriated by its greater affinity for the superabundant hydro-carbons, the nitrogenous constituents can undergo but very incomplete oxygenation.

The *rationale* of treatment by means of oxygen in such cases must be obvious. The ordinary remedies employed, *viz.*, potash salts to neutralise and render soluble the *materies morbi*, purgatives and diuretics to carry it out of the system, prove

\* Liebig states that muscular action necessarily causes more oxygen to be appropriated.

invaluable, indeed are necessary in most cases ; as also is the usual judicious advice to live less luxuriously, to go into the country, to take plenty of exercise, " Early to bed and early to rise." But I would ask, are we not continually meeting with cases of many years' standing in which our treatment and recommendations fail to remove the whole of the *materies morbi* with which the organism is saturated ? And even granting this amount of success in cases of long duration, does not the best advice often fail to alter the chronic perverted action in the nervous batteries, and thus to prevent the continued re-formation of abnormal products ? Again, I would ask, how many of our patients do we meet with who will strictly conform to our advice ? How many would follow Mr. Abernethy's " Go and live on sixpence a day and earn it ?" Many have long parted with the necessary moral control over themselves. Professional or business matters of necessity prevent some acting as they would otherwise be willing to do. Others from long suffering and general *malaise* have lost the physical power of obeying the recommendations of their medical attendants, not a few of these having become the victims of partial or general paralysis.\*

\* Paralysis is more frequently the result of lithiasis and of gouty tendency than is usually supposed. There are few cases of *hemiplegia* which may not be traced to this origin.

Now why should these last unhappy sufferers be left "without help or hope," if Providence offers a remedial agent, by the due and careful administration of which all can undoubtedly receive an amount of mitigation to their symptoms, otherwise unattainable; while many may again reach the goal of good health and be rendered fully equal to their duties in life? Oxygen can do this, if properly employed, alone or with auxiliary means. As in other maladies in which I advise its use, so in this. The effect on the universal vital forces must not be lost in simple chymistry; yet purely chymical considerations are to be regarded as of far more importance in these than in many other affections. Increase of oxygen will here unload the system, as well as raise the tone of organic life.

#### STRUMOUS AND SCROFULOUS DISEASE.

By the former term is implied the general fault in the animal economy, by the latter various external and sensible forms in which the constitutional fault evidences its presence. All authorities agree that it is a disease of general debility, and although undoubtedly hereditary as a rule, yet it may be produced (where there is no antecedent taint), just as in predisposed individuals it is commonly excited into action, by causes which tend to



impair the general health and lower the vital powers. No class of disease affords more abundant evidence of the influence of pure chymical action on the organism, when the "*vis vitæ*" loses its natural predominance. In so many terrible forms does it show itself, so universally is it disseminated through rich and poor, so much has it been on the increase, and so fearful has it become during the last half century, and moreover, in numerous instances so much injury and so little success has confessedly resulted from ordinary treatment, that it is truly refreshing to be enabled to introduce a remedial agency by means of which *almost every case can be subdued*, and through which this dire disease can, in medical hands, be brought under *certain* control.

The different varieties of form in which this disease shows itself are so frequently met with, and are consequently so well known among my professional brethren, that it would be superfluous to do more than refer generally to them. Whether this constitutional cachexia evidences its terrors in diseases of the joints, in ulcerations and other affections of the skin, or in glandular enlargements with indolent ulcers as a sequence, or in pulmonary, mesenteric, or uterine affections, in each and all such cases oxygen ought to be regarded almost in the light of a *sine qua non* adjunct to other judicious means, whenever ordinary treatment with plenty

of fresh air have previously failed to restore the invalid.

Cod-liver oil is now universally allowed to be one of our most efficacious remedies in this diathesis, yet how often does it fail to afford the advantage fairly to be anticipated from its exhibition. It is generally acknowledged by practitioners who have had the opportunity of forming a judgment, that far more success results from its use in pure country air than in town. Having myself held considerable practices in both town and country, I can bear witness to the truth of this opinion. Whenever it has been in my power to enjoin a plentiful supply of country air and well-ventilated rooms, I have invariably found the oil most efficacious in the treatment of all scrofulous affections, as well as in consumption presenting itself in strumous habits. In a confined atmosphere, on the contrary, cod-liver oil not only fails to afford relief very frequently, but often proves absolutely injurious by overloading the liver. If oxygen, however, be *judiciously* employed with the oil, I can emphatically aver that very few instances will be met with where the latter causes any gastric or hepatic derangements. The reason is sufficiently obvious; to administer cod-liver oil is to present the respiratory electro-positive elements in a form which seems peculiarly adapted for assimilation, but they may accumulate

to excess if the electro-negative oxygen is not supplied in adequate proportions;—to increase the supply of hydro-carbons judiciously we must therefore take care that the oxygen required for their slow combustion be also furnished. We do not know at what stage of the digestive process, or in what portion of the alimentary canal cod-liver oil or other fatty fluids may be absorbed; it is probable that they pass rapidly into the circulation very little altered, and thus enable the blood to receive more oxygen than it could otherwise take up; at the same time and by the same act more vital heat being generated, increased power of making healthy tissue is afforded, and the patient gaining flesh and strength can aid nature's efforts to conquer disease.

#### PULMONARY CONSUMPTION.

The preceding observations naturally lead to some considerations, in relation to the therapeutic employment of oxygen in consumption, calculated to make a complete change in the treatment of this Attila—this scourge of the present generation of the human race.

The ill success attending the ordinary treatment of this disease, and the consequently fearful mortality, are so clearly acknowledged, that no apology is needed from me in suggesting the essential cause

of this fatality, viz., the *negative error of overlooking and entirely neglecting* that great element, oxygen, in the management of advanced stages, and the *too frequent oversight in securing* healthy pulmonary expansion (*i. e.*, the due absorption of atmospheric oxygen), when advising general prophylactic measures in subjects evincing a consumptive tendency. I am induced to lay the greater stress upon this negative error, since it has lately been but too much the custom of interested individuals unfairly to attribute the terrible mortality, in a great measure, to *positive* medical error; and I can conscientiously assert, from tolerably extended experience, that examples of this error are extremely rare, affording the few exceptions, not the rule. It is indeed a libel upon the profession, and cannot be too strongly refuted.

Although consumption is occasionally developed in constitutions not in the slightest degree apparently predisposed to it from hereditary idiosyncrasy or from temperament, yet, persons of strumous diathesis are so peculiarly marked out for and include such a large majority of its victims, that it cannot but be closely associated with struma and scrofula. As I have spoken confidently of the judicious medicinal use of oxygen as the great basis of successful treatment in all cases characterised by this diathesis, so I can with equal fearlessness assert that consump-

tion, except in the last stages, is quite amenable to its influence, and claims its best rendered services.\*

So completely is the great respiratory law of nature overlooked in the *ordinary* management of consumption, that I cannot in justice omit naming two or three physicians (*rari nantes in gurgite vasto*) who have specially led the way towards the correct principles of treatment. I must be as brief as possible, otherwise I risk an extension of this Treatise which it is my wish to avoid.

To Dr. Ramadge, I believe, belongs the credit of being latterly the prime mover in the right direction.† All know how strenuously he has for some years “through evil report and good report,” urged that great principle in the correct and successful treatment of this affection, *preservation and restoration (where lost) of the healthy expansion of the pulmonary air cells*. Most of our profession know how much he and his “trumpet, child’s play-thing” have been ridiculed by the pseudo-philosophical; but fewer know how much more success has attended his simple treatment than that of the

\* Even in sufferers dying with completely disorganised lungs, I have myself managed through the gas to prolong life, to relieve the distressing dyspnoea, and altogether to bring a comfort otherwise unattainable.

† If I commit the fault of forgetting prior claims to merit on this essential point, I shall be but too glad to rectify the omission in a future edition.

pure chymico-microscopists who would not condescend to such "childish" measures. The only curious thing connected with his beautiful because natural theory is, that he has stopped short and failed to discover the true cause of success, *the giving back to the lungs the power of introducing into the system the due amount of atmospheric oxygen* necessary for health and life, owing to the previous deficiency of which the whole organism had lost its tone, digestion and assimilation had become torpid, and the invalid so depressed and languid as to neglect and indeed almost feel incapable of undergoing the efforts required for healthy chest-expansion.

Dr. E. Smith has gone somewhat farther, but has not acknowledged (as far as I can see) the debt due to Dr. Ramadge, probably from not being aware of the circumstance. I refer to four or five valuable lectures, delivered last year at the Brompton Hospital, with most of the salient points of which every practitioner must fully coincide, from previous conviction—the result of close observations in practice, as well as in morbid anatomy.

Basing his conclusion upon the well-known theory of Van der Kolk and Dr. Addison as to the identity of epithelium and tubercle, upon the minute anatomy of the air-cells, and upon his own acute and laborious observations, Dr. Smith has stated his

approval of a line of practice analogous to that recommended by Dr. Ramadge, and has moreover given explanations on several pathological points of importance noticed by the latter as facts, but unsatisfactorily accounted for. One remarkable fact may be instanced, *viz.*, the by no means rare suspension of the progress of phthisis by a catarrhal or a bronchial inflammatory attack.

The physician, to whose views I wish especially to advert, however, is Dr. Balbirnie. As far as I am aware he is the only other practitioner who *decidedly* coincides with me in opinion, that a deficiency of oxygen supplied to the animal economy is the true exciting cause of phthisis pulmonalis, whatever predisposing causes may have operated to render the system obnoxious to the malady. My space will not allow me to quote from his highly philosophical work, which contains (minus the somewhat too exclusive hydropathy) much that is interesting and instructive, and certainly merits careful perusal.

Consumption, like most other forms of disease, must not be regarded as a *simple* morbid state, but as a concurrent series of morbid states, each having only a share in the production of phenomena which characterise the whole. There are predisposing, there are exciting causes, and there are the abnormal actions resulting from those causes where

vitality lowered retains no longer the requisite control over ordinary chymical affinity. Thus temperament or any causes giving rise to general debility, sedentary in-door occupations, want of proper exercise, bad habits of any kind, may constitute the first links in the chain. Functional derangements of the digestive and assimilating organs follow, from the outset frequently accompanied by a neglect of healthy chest-expansion (*ergo* too little oxygen.) These derangements continuing, unhealthy and deficient nutritive products are afforded to the system, the various organs become incapable of executing their due amount of work,—the blood loses its supply of proper materials,—general feelings of discomfort, depression, and languor ensue, and the invalid will not or cannot be at the trouble of taking a sufficient daily number of healthy deep inspirations. The chest contracts, and (even if occasionally from pre-existent conditions such as chronic congestion or solidification, there be not much appearance of contraction externally) the air-cells become inactive and collapsed, and from this time the want of oxygen becomes the great exciting cause of disease. The products of digestion—the incipient cell-formations in the blood, in their course through the capillary vessels of the lungs cannot receive the normal vitalising changes, nor can the blood cor-



puscles get a sufficiency of oxygen to convey to the systemic circulation; the stomach, the liver, and other organs soon lose their tone; the blood becomes impoverished; destructive metamorphosis and rapid reconstruction of tissue progress too slowly; the vital powers can no longer control the tendency to chemical decompositions. Then the fermenting theory of Liebig (which has received further suggestions lately from Dr. Gardner) will come in to explain the more rapidly increasing disorganisation. The collapsed inactive air-cells become the natural *nidus* of tubercular deposit, (consisting probably of broken-down epithelium and other *debris* which disappear by absorption in healthy respiration), mixed with particles of decomposed albuminous matter. Thus the continually-forming epithelial cells are unremoved, new deposits take place, increasing fermentation or chymical decomposition of albumen co-operates, and the hapless patient soon sinks into the grave.

Assuming the admission of the above premises, earnest attention is now directed to the great error through which the mortality from this disease has so alarmingly increased. This error has originated from the *effects* being mistaken for the *cause*. Because emaciation is the dreaded symptom and of course is known to take place as a necessary consequence of diminished hydro-carbonaceous

(respiratory) material in the blood ; *ergo*, even the oxygen in the atmosphere is too great for the system, and "consuming the tissues too fast," is the direct cause of the disease ! There is too much oxygen ! Atmospheric oxygen, the *sine quâ non* of life, is the great poison ! But is not our very existence each moment dependant upon this element ? Do we not know that continual destruction of the corporeal fabric must unceasingly progress to maintain the movements of the machinery ? Have we not plain evidence that oxygen, the most powerful electro-negative element in nature, the supreme supporter of combustion, is the providential means whereby all and every the other elements are enabled to preserve the mutual relations whereby organic life is retained ? These questions must be answered affirmatively. Whence then the error ?

The medical mind has, I believe, run too close a comparison between oxygen in inorganic, and oxygen in organic matter ;—between the *simple* chymical affinities of this element, and its modified action under the control of "*vis vitæ*." Chymistry is ever an absorbing study when specially taken up, and even Liebig has added the weight of his great authority to the too prevalent error. The important consideration of the "vital dynamics" being almost ignored, we cannot wonder that the *fons et origo mali* should have been overlooked.

Is it not possible, by enlarging our views, to arrive at obviously correct conclusions on the subject of consumption, and to elicit a clear principle to guide us to certain success in its treatment? Notwithstanding every hypothesis to the contrary, my own conviction is settled, that consumption cannot seize a victim whose chest is fully expanded, and in which the air-cells are by regular exercise kept in constant activity. Experience in town and country,—a comparison of treatment under these two aspects, as likewise of differences in treatment,—and, not the least, my own personal experience in the management of my own lungs,\* have convinced me that the disease cannot exist where this point is attended to.

I believe that no individual, be he ever so much pre-disposed to struma, and thus having a proclivity to consumption as well as to a variety of ulcerations internal and external, can fail to preserve at least moderate health by proper attention to the lungs, conjoined with proper dietetic and general care. Experience has equally proved to me that, should inattention to health set up these forms of disease, and should ordinary treatment *with abundance* of atmospheric oxygen prove a

\* Hereditarily I am pre-disposed to consumption; and in Paris, nine years ago, my lungs were pronounced decidedly to be the seat of tubercular deposit.

failure, the judicious and careful exhibition of oxygen in increased quantity will rarely if ever fail, except in the last stages, and that in the last extremity it will often afford the only chance for the relief of many distressing symptoms.

To simplify our therapeutic measures, to clearly understand their *modus operandi*, to base them strictly upon the laws of nature by assisting the vital dynamics (the "*vis medicatrix naturæ*") in *nature's own way*, are requisites which must be allowed by all. The proper employment of oxygen gas in consumption fulfils all these conditions, and I hope before long to put forward such a mass of evidence as will convince the most sceptical mind of its curative powers. Be it always understood that scientific adjunct means, so ably recommended by others, must never be superseded when necessary, but that they must be regarded merely as assistants, not as curative; while the use of the gas itself must, to ensure success, be invariably directed and closely watched by the medical attendant.

#### SKIN DISEASES.

Inveterate and long-standing skin diseases in general, but especially lepra, psoriasis, boils, carbuncles, and likewise gangrenous and sloughing ulcers, have *invariably* in my hands received con-

siderable alleviation under the most unfavourable circumstances; and (however incredible such an assertion may appear) it is but right for me to add that in many such cases, where every other available treatment may have failed even to afford palliation, oxygen *fairly tried and properly carried out* may safely be guaranteed either to effect a complete cure, or at least to afford relief and subsequently great advantage and comfort to the sufferer. I am fortified in this emphatic expression of my opinion by the gratifying effects usually manifested from the very commencement of the inhalations; certainly no practitioner would be justified in withholding from any patient afflicted with such diseases this last chance of relief, were he cognizant of the value of the remedy, and were he satisfied that without it the case must be hopelessly incurable.

The exciting causes always, and the predisposing causes frequently, of every form of cutaneous eruption are *secretions interrupted or excretions retained in the blood*, general cachexia or a lowered state of vitality sooner or later following. When the alimentary matters are not properly assimilated and converted into healthy tissue, when effete matters naturally passing off by the lungs, skin, bowels, and kidneys are retained in the system, the circulation must become loaded with impurities

which will deposit themselves somewhere; and even if the function of the skin only be interfered with, eruptions will appear, owing to the retention of the usual transpiratory matters; unless indeed, the bowels, lungs, and kidneys can manage *by over-work* to compensate for deficient cutaneous action. Whenever such a condition of things is *long continued*, oxygen medicinally increased is urgently called for internally and sometimes externally. The effete matters continually passing out of the body are well known to undergo their necessary transformation by means of a sufficient supply of atmospheric oxygen, but when from various causes (enumerated in other parts of this treatise) a deficiency of this element has long existed, the normal balance of the food taken and the oxygen absorbed having been neglected,—obstinate eruptions often make their appearance as one of the consequences. One point is plainly indicated, that if an accumulation of effete *debris* upon and beneath the cutaneous surface has arisen from the used-up tissues not having been fully oxygenated, a temporarily increased supply of oxygen should be given to assist Nature after her own method.\* By this means alone can treatment frequently

\* Auxiliary means, the plentiful use of water externally, and gentle medicinal assistance where desirable, of course would not be neglected.

be rendered successful in chronic cases,—the impurities in the circulation are thus fully oxygenated,—the whole organism receives simultaneously renewed vigour,—the healthy action of the cutaneous capillaries and glands becomes re-established,—and the entire nervous system resumes its controlling influence over the secretory and excretory functions by being again supplied with pure and healthy blood. In determining impurities to the skin Nature is engaged in a conservative operation, in which her powers should rather be supported than depressed; and here oxygen proves its value, as it hastens transformation and excretion, and gives tone instead of causing depression.

#### CANCER

Is a malady so fearful and hitherto so incurable, that I must not omit naming it as an affection in which I anticipate great results from oxygen. I am not yet in a position to say positively that cancer has been cured by this agent, because no man can in such a disease assert that he has *cured*, unless he possesses facts to show that he has by *purely* constitutional means caused such an entire alteration in the system as to bring about the closure and healing of well-marked deep ulcerations with extensive surrounding indurations,

or the absorption of tumours, of a *true cancerous* character. I believe that but few impartial judges will fail to join in an energetic protest against that extensive use of caustics as a "cure" for cancer, which has unfortunately for the miserable victims of this disease become of late years so fashionable. The knife under chloroform is undoubtedly the best local remedy, for it affords a rapid and almost painless mode of relief (which caustics certainly do not), and moreover an average exemption of twelve months or two years from further progress of the disease; add to which, the constitution may then under the most favourable circumstances be subjected to alterative treatment so as at least to attempt the eradication of the cancerous tendency in the organism. Caustic treatment on the contrary but too often takes away the only chance of cure, by destroying the remaining vital power in the organism through *long-continued* pain, sloughing, discharge, and constitutional irritation. With few exceptions, the real interests of the patient are entirely opposed to the extensive use of the various caustics (including that lately introduced by Dr. Fell), although a *very limited* and judicious use of such local means may be resorted to by the surgeon with advantage in some cases,—local means however, always being regarded merely as auxiliary to any energetic constitutional measures which are calculated to alter the faulty



condition in the organism. The constitutional measures hitherto adopted have never afforded more benefit than temporary arrest of the progress of the disease and palliation of the patient's distress.\*

That which is really needed to cure cancer is a remedy which can change the condition of the patient's blood, cause more rapid metamorphosis of tissue, give increased tone to the nervous system, improve the general health, and thus eradicate the tendency to perverted nutrition and that peculiarly faulty cell-formation which characterise the cancerous diathesis. These desiderata may, I trust, be obtained by judiciously augmented oxygenation. Late experience has almost convinced me of this; I avoid saying more at present, but I hope in a few months to be in a position to speak quite decisively.

#### CONGESTION.

I believe that the peculiar pathological condition understood by this term, is a principal cause of various distressing symptoms and morbid states, which according to locality and apparent peculiarities nosology classes as widely differing diseases. Indi-

\* While severe operative procedure as a rule appears unjustifiable, because only conducive to an increase of the sufferings, palliation has in two or three cases on record permitted Nature to take the matter into her own hands and cast off the whole mass..

vidually I have no doubt that deficient oxygenation of the blood is a very general cause of congestion. We may ask what becomes of the venous blood when not duly arterialized in the pulmonary capillaries? Its circulation is not immediately arrested in the lungs, but it continues flowing in the arteries until it reaches the systemic capillaries, where from the experiments of Dr. J. Reid, and more lately of Professors Erichsen and Sharpey, it is retarded; the admission, however, of atmospheric air, but still more of oxygen, quickly causing a renewal of the current.\*

No circumstance in the use of oxygen has appeared to me more remarkable than the rapidity with which some apparently dissimilar affections occasionally yield to its influence, *e. g.* headache, noises in the head, neuralgia, partial paralysis, suspension of the catamenia, and some kinds of

\* Dr. Carpenter, quoting Professor Draper, says,—“It appears fully capable of proof, that ‘if two liquids communicate with one another in a capillary tube, or in a porous or parenchymatous structure, and have for that tube or structure different chymical affinities, movement will ensue; that liquid which has the most energetic affinity will move with the greatest velocity, and may even drive the other liquid before it.’ Now arterial blood,—containing oxygen, with which it is ready to part, and being prepared to receive in exchange the carbonic acid which the tissues set free, must obviously have a greater affinity for those tissues than venous blood, in which both these changes have been effected already.”

cough. I have frequently known a most severe headache succumb at once to a dose of this gas. In such cases the patient may be content with the relief afforded—not so the medical practitioner, who naturally wishes to understand the principle of its action; and in these rapid cases I have been able to come to no other conclusion so rational as a belief that the affection has originated in local congestion, caused by a portion of imperfectly arterialized blood being arrested in the arterial capillaries, and that the increased oxygen supplied for a short period, by removing the cause at once, also relieves the consequence. Congestion, from imperfect oxygenation, may occur in the sthenic or asthenic; it may occur as the result of diminished capacity of the air-cells; from a variety of causes deteriorating the atmosphere inhaled; or from the patient either habitually or on some one occasion taking so large a proportion of respiratory food into the system, that the blood over charged with carbon and its compounds not duly oxygenated, passes (to the left side) of the heart and into the systemic circulation.

#### NERVOUS DISEASE

Is to the medical mind etymological of a numerous and anomalous class of affections—affections which frequently assume the most eccentric and varied

forms, to each of which we can give no separate name, but the whole of which may be included in the single definition—*Nervous*.

Various causes originate these affections, but they principally depend (as every well-informed practitioner so well knows) on the artificial as distinguished from the natural mode of living, and especially from the undue influence which, in the present day, the mind is allowed to exercise over the body, the powers of the latter being totally unequal to reduce the preponderating influence of the former. Intellect is not omnipotent; but its actual power over the organized matter to which it is attached is much greater than is commonly imagined. The savage, the rustic, the mechanical drudge, and the infant whose faculties have not had time to unfold themselves, may, for the most part, be regarded as machines regulated mainly by physical agents; but man matured, civilized, and by due culture raised to his proper level in the scale of being, partakes more of a moral than of an animal character, and is in consequence more constantly worked upon by agents that apply themselves to his imagination, his passions, or his judgment, rather than by those which are directed immediately to the parts and functions of his material organization. These observations peculiarly apply to the inhabitants of our voluptuous,

fashionable, commercial metropolis and large towns, who exist in a state of more exalted excitement and irritative perturbation than can be occasioned by the comparatively monotonous circumstances of merely rural existence. The labour of the poor man relieves him at least from the burden of fashionable *ennui*; and the constant pressure of physical inconvenience exempts him from the more elegant, but surely not less intolerable distresses of a refined and romantic sensibility. Thus, the poor suffer less from many of the most distressing and sometimes most painful nervous diseases, to which their richer and more prosperous neighbours are extremely obnoxious.

Nervous diseases are so various as to the symptoms developed and so anomalous in character, that any attempt minutely to classify or enumerate them appears to me at least superfluous, if not calculated to lead to actual error in treatment. Some physicians class nearly the whole under one name—"Hysteria." Whether the case be one of cerebral, spinal, or ganglionic irritation,—whether one of uterine or other special and local nervous irritation, or a general nervous irritation, one pathological state exists in all, *viz.*, a loss of the normal equilibrium or balance of force, which should exist in the magneto-electric or nervous batteries. The indication for cure is so to strengthen the latter as

to restore the general nervous equilibrium, and no medicine will accomplish this more effectually and agreeably than the use of oxygen, (and in some cases protoxide of nitrogen), attention being paid of course to the supply of iron and hydro-carbons, where needed. There are, however, as every practitioner knows, a considerable proportion of instances where mental emotions and impressions originate and continue nervous affections. In the majority of these, oxygen, it is almost needless to add, would probably prove as useless as other *directly*-medicinal treatment, inasmuch as the patient can generally derive advantage from moral management only. Nevertheless, as physical nervous disease very frequently produces mental nervous derangement, so the latter (even when slight) by no means rarely gives rise to severe cases of the former. I have had cases of this combination of evils, where the relief of the physical ailment by oxygen has reflected itself upon the mental, causing some improvement in the latter; yet as a rule, I should limit the employment of oxygen to physical derangements of the nerves, and to mental affections consequent thereupon.

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Oxygen is either directly indicated, or may be tried with advantage, and I would not hesitate to give it, in various low fevers, scarlatina maligna,

typhus, or cholera. I have had no experience of its use in the two former; but from what I observed when superintending the Manchester Cholera Hospital in 1849, I have no doubt of its value in the latter disease if exhibited early enough, and its therapeutic action properly supported by other remedies.

In ovarian tumours and other adventitious growths and deposits oxygen is clearly indicated. Here we require rapid and complete transformation of tissue; in serious cases I push the oxygen freely;—knowing that highly vitalized structure is the last to succumb to its metamorphic potency, and therefore that we may expect to destroy the morbid deposit, before we seriously waste healthy structure.

In another class of distressing affections which are very unmanageable, I am able to assert (from experience) that increased oxygenation of the blood proves highly useful and curative,—I allude to uterine affections, as congestion, irritation, ulceration, &c., &c. Whether these affections have been caused by parturient difficulties, or whether they have had some other causation, they never are long persistent without bringing the sufferer (either from the effects of the disease, or the *operation of the remedies*) into a state of constitutional debility and exalted sensibility or irritability of the nervous

system, which makes life wearisome to the unfortunate patient, and sometimes impairs the happiness of her domestic associations.

Perhaps no example of the abuse of *local* treatment in the present day can be brought forward equal to that effected *ope speculi vaginæ*, which has been so fashionable, and which has increased so alarmingly and to, I fear, a demoralizing extent during the last few years. Of course this mode of treatment is in some cases absolutely necessary, but I protest against the indiscriminate and unnecessary employment of it where constitutional means properly directed would suffice for the cure. Indeed I cannot but accord with Dr. R. Lee and others, who strenuously oppose the too common practice, which may fairly be considered as a weak substitute for scientifically directed constitutional management; while it may be asserted as an indubitable truth, that the judicious use of oxygen with (when advisable) other carefully-adapted medicinal and hygienic means, will, in nineteen cases out of twenty, accomplish not only a perfect cure, but by an irreproachable, agreeable, and painless method.\*

\* A lady of title of very quick perception, and a very close observer, remarked to me only a few days ago with indignation, that in numbers of "speculum" cases which she knew of, scarcely one ever appeared really cured, and that one edition of local application always appeared soon to necessitate second and third editions.



Space will not at present permit me, even if it were necessary, to enter into further *details* respecting the therapeutic power of oxygen in many other diseased conditions; to do so, indeed, would be superfluous, for the extended application to which this remedial agent may be subjected in disease, must be obvious to every enlightened practitioner of medicine, if he gives the subject his consideration, or favours me with a careful perusal of foregoing remarks and of the selected cases following. A broad principle is laid down, patent to every physiologist and indeed to every student of nature's laws. We all know generally the truth of this broad principle, but I have endeavoured to investigate it specially, and to reduce it to practical application, by an extensive and varied employment in my practice of nature's great hygienic and curative electro-negative.

In concluding this part of my subject my brother practitioners may expect that I will give them minute instructions as to doses, &c.,—but in this respect the information I can afford must be general rather than particular. The practitioner must attend most carefully to details necessarily to be learnt by himself, and in some cases each inhalation must be closely watched. To prescribe a particular dose without reference to the specialities of each patient's case, would be, with oxygen as with all other medicines, an empirical mode of advising a remedy

not *per se* empirical. The *minimum* dose I usually give is five or six pints of gas diluted with eight or ten times that quantity of atmospheric air; the *maximum* dose is 50 pints gas to 400 or 500 of air; the doses varying in quantity between these extremes, and being repeated according to effects produced or desired. I also order to be taken soon after a meal, or at a long interval, as may be indicated by condition of the patient. If we desire to reduce a plethoric patient, whose blood is overloaded with rich carbonaceous constituents, the condition of the blood must be altered with oxygen, and the diet so regulated as to prevent his defeating our intention; if it be desired to give tone to a reduced anæmic patient, I assist the oxygen by cod-liver oil, iron, and such diet and fluids as enable the impoverished blood to take it up.

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I also use in conjunction with oxygen, any other acknowledged and approved medicine which seems to be required, but as a rule, in reduced doses, since I find their effects are frequently obtained more easily under the use of oxygen. It appears, as far as my experience goes, that the oxygen increases the vital electric powers, and renders the patient more amenable to the specific action of medicines.

Should it be supposed that, as I use other remedies when necessary in conjunction with oxygen, these remedies afford the benefit, and not the oxygen;

my reply is that all, or nearly all of the patients for whom I prescribe oxygen, have been previously under the treatment of our best practitioners;—as I have often succeeded where they have failed, it is more rational to give credit to the oxygen as the primary means of benefit, than to take it to myself as a more successful prescriber of medicines. Moreover in many cases of great severity oxygen has unaided cured the patients.

In order to obtain success from the inhalation of oxygen we must take care not only that the blood is in a condition to absorb it, but that it be properly presented to the blood through the medium of the lungs.

There is an apparatus invented by a Mr. Barth, which ought to be made known to the profession, as I find it by far the most convenient, and indeed in many cases the only practicable one for the purpose. It is very portable. Condensed gas (twelve or thirteen gallons in small iron bottles) is supplied with it, and thus it admits of being used with facility at the patient's bedside, while the medical attendant is saved the trouble either of preparing the oxygen or seeing it prepared. However, the form of inhaling apparatus is of secondary importance provided that the gas be very pure, properly diluted with air under scientific direction, and absorbed by the blood in its passage through the lungs.

## RECENT CASES

DEMONSTRATING THE THERAPEUTIC EFFICACY OF OXYGEN  
AFTER THE FAILURE OF OTHER REMEDIAL TREATMENT.

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## EPILEPSY.

Mr. W. R. R——, æt. 41, unmarried, consulted me May 26th, 1856 ;—temperament bilio-nervous, habits regular ; in consequence of his unfortunate malady, has been compelled throughout life to exercise the greatest caution as to diet, &c.

He became epileptic at seven years of age, from the sudden explosion of a cracker close to his ear, but the fits were mild and not very frequent until he attained his 15th year, when he received a serious fright at school ; since which period he has suffered from paroxysms, more or less severe, every fortnight or three weeks ; he has been thus rendered incapable of following any regular occupation, and always feeling better when taking plenty of out-door exercise in the country, has latterly resided on a farm in Devonshire, amusing himself with any little farming pursuits he found suitable.

He cannot bear much cold, but he is compelled to sleep with the window open every night; he frequently experiences much oppression on the vertex of the head, especially when anything has chanced to disagree with his stomach; and before his attacks, the whole of the right half of the body feels very cold and chilly.

His face is thin and sallow, his eyes sunken with deep dark areolæ around the eyelids, tongue pale and slightly furred, appetite moderate, liver rather torpid, pulse small and feeble, and there is a tendency to piles and to constipation. He is irritable and soon excited with passion, especially just before his attacks. He says that he has tried every mode of treatment which appeared to offer the most remote chance of cure, and that his only relief has been derived from latterly taking vegetable charcoal in large doses.

Under these circumstances, although the prognosis could not but be unfavourable, I determined to give a fair trial to a judicious and carefully-watched course of oxygen. The effects were most remarkable, exceeding my most sanguine expectations, for from the commencement to the termination of the treatment, a period of three months, he suffered no paroxysm whatever; his general health gradually became stronger, his eyes fuller and brighter, his mental powers increased, and at length he entirely lost his former extreme irritability and became cheerful and happy. Several months afterwards, I had the satisfaction of hearing a most favourable account of this patient, who had experienced no return of the epileptic attacks.

## INTRACTABLE BOILS AND CARBUNCLES.

A. B——, a policeman, æt. 36, having been nearly three months under skilful medical treatment for this painful and distressing malady, was at length advised that medicine could do no more for him, and that he must get immediately into the country to try what change of air could effect. He was at this time covered with 20 or 30 large boils and carbuncles, and his health was much undermined from acute suffering. Being accidentally heard of, he was offered gratuitous treatment under oxygen; as having a family to provide for, he could ill afford to leave them. Thankfully accepting the offer, he at once commenced a daily inhalation, and so rapid was his progress that in from ten days to a fortnight all the eruptions had entirely disappeared, and the unhealthy constitutional condition was so completely overcome as to render the cure permanent.

## MESENTERIC DISEASE.

Miss A. B. æt. five years, with fair transparent skin and flaxen hair, had never been very strong, but at length became much debilitated; abdomen hard and much enlarged, breath very foetid, face wan, bowels irregular, with small frequent offensive evacuations. Hectic fever, &c., setting in, her parents thought her in a dangerous condition, and as a last resource determined to send her to the sea-side. At this juncture

the use of oxygen was suggested, and it was determined at once to give it a trial, in the hope that it might avoid the expense and inconvenience of the journey, and prove more beneficial. Under the careful administration of this powerful remedy, conjoined with general careful management and well-regulated diet, the child gradually began to improve, and in two months was quite restored to health. She has ever since, it may be added, enjoyed excellent health.

CHRONIC CONGESTION OF LIVER AND BRAIN, WITH  
PARTIAL PARALYSIS.

Colonel R., æt. 61, residing near Malvern, came up to town in July, 1856, and placed himself under my care.—Constitution naturally very strong — habits always regular; but he formerly saw much service in tropical climates, and underwent severe hardships which would have (as he has been often told) “killed most men.” As the result, he has been for many years subject to liver derangement, for the relief of which hydropathic treatment has been of great advantage to him. Latterly, however, his health deteriorated so much that his friends became seriously alarmed about him, and induced him to consult me.

He now informs me, that for some months he has been unable, and indeed has been forbidden by his medical attendants, to perform his former customary ablutions with cold water, owing to the “rush of blood towards his head,” with vertigo, whenever he at-

tempts to raise his arm to his head; that he is very sensitive to the effects of cold weather, and his memory has lately failed so much, that he feels great difficulty in remembering anything.

His countenance presents a blue congested appearance; the coats of the eyes, especially the conjunctivæ, are much injected; the tongue looks relaxed and foul, and is covered with a thick yellowish-white fur; the pulse is slow, laboured, and subject to frequent intermissions; head feels dull and heavy; there is aching pain in the right shoulder and between the scapulæ; considerable uneasiness is experienced in the hypochondria, especially the right; the liver is a good deal enlarged; the colon much distended with flatus; the bowels are rather sluggish, and the urine loaded with lithates. There exists besides partial paralysis of one side, several fingers being useless and drawn in tightly by the flexor muscles.

Under these unfavourable circumstances I recommended him at once to try a course of oxygen gas. A carefully-regulated dose was inhaled twice a day, and the effects closely observed. Improvement immediately commenced, and in four or five days he lost the greater part of his oppressive head-ache, while he expressed himself as finding his memory wonderfully better in so short a time. The treatment was steadily continued for between a fortnight and three weeks, and although his natural energy, when he felt himself so much benefitted, led him after the first few days to do much more than I quite approved of, yet he rapidly



progressed, and left London in a good state of health. Soon after the commencement of the inhalations I had permitted him to perform his cold ablutions daily, and this he did without difficulty.

The only adjunct measures that I adopted were an occasional *very* gentle laxative, and strict attention to certain judicious regulations with regard to diet.

Experience has proved to me the fact of no therapeutic being equal to oxygen in the treatment and cure of many cases of this nature; in a number of threatened attacks which I have treated, oxygen has rapidly restored the subjects of them to perfect health, where previously, *malgré* the most judicious general care and medical treatment, the symptoms were becoming daily more urgent and alarming. Moreover, even in chronic long-existing paralysis (hemiplegia as well as paraplegia), in the absence of any extensive disorganisation softening and loss of nervous substance, I have met with most gratifying results; in some instances, after complete helplessness for years, the sufferers have gradually recovered in a great degree the use of their limbs and their enjoyment of life.

#### SECONDARY SYPHILIS, SLOUGHING ULCER OF LEG, &c.

S.....B....., Esq., æt. 33, unmarried, of temperate habits, of nervo-sanguineous temperament, with some hereditary strumous tendency, had been the subject of secondary syphilis for seven years, and had undergone a variety of fruitless treatment. Amongst

other measures, he had, under the best advice, been the subject of several courses of mercury, iodide of potassium, sarsaparilla, nitric acid, and all the most approved means usually employed in treating such cases. Finding himself rather worse than better, and coming to the sad conclusion that his constitution had become terribly shattered quite as much from the mercurial treatment as from the original disease, he resolved by the advice of a friend to place himself at a hydropathic establishment. Here he underwent such extremely severe treatment, that he was compelled, after some weeks, to give it up, owing to increased general weakness and exhaustion of his nervous system, with tendency to ulceration of the legs. He now consulted several eminent practitioners; had iodide of potassium, cinchona, &c., as well as the most generous diet, port wine, and stout, prescribed for him, and was advised, as the only hope of cure, to take a long sea-voyage to a warmer climate. He had made up his mind to follow this advice, when one of his legs became suddenly so seriously ulcerated, and his whole system so debilitated, that he determined to place himself under my care, in consequence of learning the extraordinary curative agency of oxygen in many cases of ulcerated legs and general debility.

*June 29th, 1856.*—This unfortunate gentleman consulted me. I found him extremely weak and anæmic; his former powerful and muscular frame completely relaxed and attenuated. The skin throughout the body was quite blanched, and so transparent, as to

shew deeply beneath the surface much dark congestion, with occasional spots of purpura. Some caries of one superior maxillary bone existed; he suffered much from irritation of the brain, with eyes suffused and intolerant of light, and chronic iritis; pulse from 100 to 110, very small and almost imperceptible; tongue white and fissured; and although the weather was tolerably warm, his vital powers were so low as to render it almost impossible to generate sufficient animal heat to keep him alive — the extremities being cold and clammy. In fact, universal prostration and torpidity of function prevailed. In addition, he had a suspicious, short, hacking cough, (which had existed for some months) with profuse night perspirations, but no well-marked *physical* signs of tubercular deposit. Upon examination of his legs, a very large ulcer was seen on one calf, a small one on the other. The larger one, he informed me, commenced in a *little spot*, about a fortnight previously, and had for some days been spreading very rapidly, causing much severe pain and constitutional irritation. It now presents the peculiar appearance of a sloughing mercurio-syphilitic ulcer, exactly circular, about two inches in depth, considerably excavated; the whole circumference, for the distance of an inch and a half or two inches from the edges, is hard, red, and extremely sensitive. There is a discharge of dirty-looking sloughy matter, and acrid sanious fluid. In spite of the vigorous and judicious measures advised by an eminent London surgeon, who had been consulted a few days previously, the sloughing ulceration

is rapidly extending, and in the excessively prostrated condition of the sufferer, the case appears by no means hopeful.

Here an opportunity offered of severely testing the power of oxygen, and knowing what this therapeutic agent could effect in analogous non-syphilitic ulcers, and in most cases of extreme debility and languid circulation, I at once determined energetically to bring it into action.

My patient was ordered to preserve the horizontal position, and to foment, poultice, &c. The same afternoon I administered a large dose of the gas, which had the effect of making him feel more comfortable. The next morning, the ulcer still alarmingly progressing, I carefully superintended the administration of the largest quantity that could be borne, and ordered a moderate inhalation in the evening. From that time it spread no further, and by daily watching my patient during the succeeding fortnight, I had the satisfaction to witness the separation of the dead portions, the perfect cleansing of the whole surface, (the muscle being left exposed for some distance and its movements being seen at the bottom of the cavity), and the gradual filling up of the excavation with granulations; while at the same time the appetite returned, and the capillary circulation, with the entire nervous system, began to regain tone. Small doses (one grain) of iodide of potassium were now ordered three times a day; nutritious but moderate diet with porter; cod-liver oil was rubbed into the chest twice a day: and tepid

daily sponging of the whole body was enjoined. In five weeks he was able to walk about, and in seven weeks entire healing of the large and deep excavation, resulting from the ulceration, had taken place, permitting him without difficulty to walk many miles. He now left town, taking with him a supply of oxygen, being directed to continue his iodide of potassium and cod-liver oil, and to communicate with me by letter once a week. Three weeks afterwards, having walked rather too much, and having otherwise irritated and injured the place on the other leg, where the small point of ulceration had apparently healed under the influence of the oxygen without sloughing, he thought it advisable to return to London. I found an ulcer of moderate size and much inflamed from irritation—rubbing of the trousers against it, and neglect; moreover he had caught a severe cold, and his cough, which had never left him, with profuse perspirations at night, disturbed him much. He was feeble and extremely sensitive to cold, although the weather was warm. I gave him strict directions as to quiet for his leg; largely increased his quantity of oxygen, at each inhalation night and morning, and continued his other constitutional treatment, as above-mentioned, for the specific diseases. He again progressed most satisfactorily, and was soon largely enjoying his favourite pedestrian exercise.

Steadily continuing his treatment, he towards the middle of September had entirely lost his consumptive cough, had fully regained his nervous tone, and had re-

covered his flesh, he suffered no longer from cold and languid circulation; the dirty congested appearance beneath the cuticle had quite disappeared, the jaw seemed quite sound (a small piece had exfoliated), and the general cerebral irritation with iritis had for several weeks ceased to evidence itself.

About the end of October this gentleman (an ardent disciple of Nimrod) wrote to ask whether he might follow the hounds again. With a caution I acceded to his request, and I have since learned that he rode very hard throughout the hunting season without any return of his former protracted disease.

It is especially worthy of remark, with this interesting case in retrospect, that there exists no remedy at all comparable with oxygen, as (in common *parlance*) a "purifier of the blood." My own experience particularly points to its well-marked and energetic action upon the general capillary circulation and upon the skin; in most cases it powerfully promotes the healthy secretions of the latter, and enables it to throw off an immense amount of morbid and poisonous matter, and unlike all other medicines, while performing this duty, it produces no weakening or other untoward effects, but, on the contrary, simultaneously acts as a general tonic to the entire constitution. It will be observed that I ordered, as an *essential* adjunct to treatment, tepid sponging of the whole body; the poisonous *débris* cast off with the aid of the gas, and accumulating on the skin, obviously necessitating such sponging or the use of the tepid bath. It also merits a passing notice

how quickly the heroic doses of the gas, temporarily and carefully given, demonstrated the power of this therapeutic in cutting short and arresting the progress of *rapidly-spreading* ulceration.

In no cases of either external or internal ulceration have I failed to obtain advantage from a careful and judiciously-regulated employment of this gas, conjoined where necessary with such other medicinal and general measures as changing symptoms appeared to indicate. Not only does this apply to ulcers of ordinary character, but likewise to those of the most cachectic and even malignant species, including that hitherto incurable disease—cancer. The foregoing case is a remarkable instance of its curative agency where the worst animal poisons have long held possession of the system.

DISEASE OF CERVICAL VERTEBRÆ, AND ADJACENT  
TISSUES.

The Rev. T. A. W——, a curate, residing in Essex, wrote to me October 25, 1856, in the following terms:—"Is the pneumatic medicine applicable to a disease of the cervical vertebræ, attended with slight curvature and considerable swelling and hardness of the parts, with occasionally much pain? The swelling is confined to the right side, but there is considerable pain, and a *burning* sensation felt on the *left side*. Upwards of three months I *have been* confined to bed, and under the direction of Sir ——,

have applied a succession of blisters and taken the bi-chloride of mercury until the gums were affected, and since that several quarts of cod-liver oil, besides a good deal of quinine and iron, but as yet with little alleviation of the complaint." He then proceeded to ask whether it would "be necessary to go up to London, which would be with much difficulty and no little risk accomplished;" and then added, "An *immediate* reply will oblige. It may be as well to state there is constant pain, more or less felt, which prevents sitting erect for more than a few minutes at a time, with numbness of the fingers of both hands, particularly the right, and occasional slight pains in the arms. The pain in the right side seems sometimes to be more deep seated than at other times, as though it were sticking into the medullary (spinal marrow). Quite nauseated with the drug system, I have no longer MUCH FAITH in its therapeutic efficacy."

My reply to this was, that a judicious and carefully-regulated course of oxygen might be of great advantage to him, and my experience led me to entertain no inconsiderable hopes that a cure might be effected. If he were not able personally to consult me in London, my advice would be that his ordinary medical attendants should carefully watch and follow out the treatment in communication with me by letter.

Three weeks afterwards this gentleman introduced himself at my consulting-room, and stated that he had determined to run every hazard in order to have a personal interview with me. I found his general condition



much as he had described it in his letter: there was extensive tumefaction, hardness and thickening of the cervical vertebræ (periosteum?) and of all the adjoining and superincumbent tissues, from the base of the brain to the seventh vertebra; considerable and severe pain upon pressure and upon slightest motion; neck perfectly fixed and stiff, and the head turned towards the left side; tongue foul; pulse quick and irritable; much numbness but as yet no paralysis of the extremities. Altogether he felt in a helpless miserable state, and had been compelled to resign his curacy without the most remote hope of ever again being capable of such duty, or even of partial recovery.

Careful and minute directions were given as to diet and other adjunct means, and oxygen inhalation was at once commenced, the patient being closely observed during the administration of his daily dose. Belladonna fomentations were prescribed as a frequent local application. The result was, that in a few weeks he improved so much as to be permitted a considerable amount of *walking* exercise, the spine being unable of course to bear the shaking of any vehicle; at the same time the general constitutional irritation and pain gradually subsided, and the swelling much diminished.

At Christmas he went into the country amongst his friends, having recommenced cod-liver oil, which I had previously ordered to be temporarily suspended. In ten days he returned, and although some stomach and hepatic derangement gave indications of his having indulged in the good things of the season much more

than accorded with my strictly-enjoined dietetic rules, yet the neck was still progressing favourably.

Between the 18th and 26th January, the weather being wet and damp, and prudence not having been altogether considered, he had a severe cold with general rheumatic pains, urine loaded with lithates; took a mixture of pot. bicarb. &c., and suspended the oxygen for a few days; yet notwithstanding this severe attack, no material return of his former symptoms took place.

*March 7.*—My patient called. I had not seen him for three weeks, during which, for the first time since the commencement of the course, oxygen had been completely discontinued. He had feared retrogression, but had been agreeably disappointed. I was much gratified to find him overflowing with spirits in consequence of his having nearly recovered the natural mobility of the neck, and being (as he said) "up to anything." In fact, he was again fit for his clerical duties, tumefaction and induration had almost entirely disappeared, no pain whatever remained, and no concussion, even in an omnibus, had caused unpleasant sensation. A perfect cure was effected.

I heard from this patient in June last; he stated he had been obliged to travel from place to place on urgent concerns of a family nature, and believes that the marvellous benefit derived from the oxygen, under the Divine blessing, had alone enabled him to accomplish the onerous duties which had devolved on him.

In very few cases of chronic deep-seated disease

have I found much advantage from severe counter-irritation, such as setons, issues, successive blisters, &c., frequently the augmented constitutional irritation from their presence adds to the debility, and more than neutralises any benefit to be anticipated. Oxygen gas is the remedy in all such diseases (I include diseased joints,) especially in those characterised by the scrofulous diathesis. Much suffering from surgical treatment might be frequently avoided by placing invalids in the hands of the physician for purely constitutional treatment, and subsequently employing the knife, if needed, as a *dernier ressort*.

## CHRONIC NERVO-CONGESTIVE HEADACHE.

Mr. G——, æt. 50, a merchant engaged in the West Indian trade, of nervo-bilious temperament, very regular habits, consulted me June 9, 1856. He stated that he had suffered very severely for some years from frequent headaches, which were invariably produced by every noise and excitement; had formerly resided for a considerable period in the West Indies (Jamaica, I believe), and had then experienced occasional attacks of hepatic derangement, for which a good deal of mercury had been at different times administered; but he had escaped intermittent and yellow fever. Notwithstanding the utmost care in diet and general hygienic rule, which this gentleman had long been in the habit of practising, these cephalalgic attacks were becoming more frequent and distressing from slight causes, and of longer duration;

but he especially suffered when business occasionally necessitated a journey to London, for during the whole time of his usual sojourn in town, he never felt himself free from pain.

A friend having recommended him to consult me as to the chance of oxygen affording benefit in his case, he determined to take that course immediately upon his arrival in London. I found him suffering from the usual chain of symptoms attending torpor and general derangement of liver, stomach, and spleen; he was much depressed, and his face presented a sallow, worn appearance, with yellow conjunctivæ; head-symptoms very bad.

Feeling assured that a judicious use of oxygen would quickly evince beneficial effects, I advised him at once to give it a trial. The first dose that I administered completely removed the pain, and made him "feel quite a different man;" and with one dose daily, to his surprise, he kept light and well with excellent appetite during the few days that he was in London. Upon leaving for his residence in Wiltshire, he took a supply of the gas for ten days, and I lost sight of him. Six months afterwards I heard as the effect of this very short course of treatment, that there had been no return whatever of the headaches, and that he was in the enjoyment of perfectly good health.

The characteristic nervo-congestive headaches, of which the above was so severe an instance, are well known amongst most of my professional brethren

as being frequently very intractable. In most of such cases oxygen ought invariably to have a *fair trial*, where all ordinary means have previously failed. The writer himself was formerly very subject to this description of cephalalgia, and has had ample experience in his own person of the beneficial effects of the gas. He well remembers likewise a physician, a personal friend, who had come to town from Yorkshire to give evidence in a trial, calling with a most severe nervo-congestive headache from over-work—mental and bodily. This attack had been so persistent for a day or two, and was becoming so much worse, that he felt quite upset and hardly knew how he should be able to give his evidence. Two or three doses of oxygen (the first removing the headache), put him quite right, and he was able to return to his large practice in capital health, not having felt at all well before his journey.

EXTREME DEBILITY, WITH EPILEPSY AND SPERMATORRHOEA.

Mr. John M——, æt. 27, consulted me in the early part of 1856. History as follows:—Up to the age of 21, had enjoyed good health, but then began to be troubled with pain in the loins and back, with frequent and distressing *seminis emissiones*. For these symptoms several medical gentlemen were consulted, but their treatment failed in affording him the slightest alleviation; and in consequence he was persuaded to try “those villainous Morison’s Pills,” as he indignantly called them; continued taking them for

eighteen months, became still more "thin and weak," and at length "frequently brought away large pieces of skin from the bowels." Epileptic fits of a severe character now occurred, with exacerbations of most of his previous symptoms. During the following few years a succession of medical practitioners were tried; "pain in back and side continued, together with that peculiar swimming and giddiness in the head which always preceded the epileptic attacks." Weakness increasing, the sea-side was advised and tried, but he returned "rather worse than better."

At this period he called on me. He presented an appearance of extreme debility, face pallid, with hollow cheeks, whole body anæmic and much attenuated; he complained of constant pain in the back and hypochondria; his head-attacks were so severe as almost to incapacitate him for any work at his trade (pianoforte-manufacturing). Pulse very feeble, almost imperceptible; extremities always cold. Stated that he had "almost lost all faith in any remedy, new or old."

With strict regulations as to nutritious concentrated diet and other general measures he was placed under a course of oxygen inhalation. Within a few days (as he expressed himself), he felt as he had "not done for years before," as though he had "suddenly received a new supply of health and strength." Altogether he continued the treatment for six weeks, and notwithstanding that I had some trouble with his digestive and assimilating organs, he felt himself at the end of that time fully equal to his occupation. All his dis-

treaching symptoms had disappeared, and he had almost regained his pristine vigour of mind and body. I have lately heard that his health was quite restored, there having been no relapse.

CHRONIC DYSPEPSIA, ETC., WITH SEVERE CEREBRO-SPINAL IRRITATION.

Mr. W. L. K., a schoolmaster, æt. 47, of regular habits and religious character, of nervo-bilious excitable temperament, has never been very strong, but always energetic and active in mind and body; was married at 32, now a widower. Has from childhood been the subject of incontinence of urine, with great weakness of the muscular coat of the bladder. About two years ago, after a slight fall and subsequent chill from travelling in wet clothes, began frequently to pass much blood from his bladder. Since that time has suffered from extreme nervousness, frequent inability to sleep at night from morbid fear of being alone or of dying suddenly, with other hypochondriacal symptoms of an unpleasant character. About twelve months ago, finding himself scarcely equal to his occupation, he was induced to consult me, by a clergyman who felt much interest in him and feared that his increasing debility and general ill-health would soon oblige him to resign the care of the school. He now presented an anxious, care-worn aspect, *mouth slightly drawn down on one side*, eyes lachrymose with yellow and congested conjunctivæ; he complained of much pressive cephalalgia especially

in the occiput and nape of the neck; much uneasiness and some pain upon pressure in the right hypochondrium and in the epigastrium, as well as in the hypogastric region; frequent passage of blood in the urine; constant aching pain in the loins; constipated bowels with much flatulence, and extreme depression and weakness mental and bodily, alternating with fits of morbid excitement. Percussion evidenced considerable gaseous distention of the transverse colon; no appetite, but much thirst was present.

This being a case in which my experience of oxygen led me to anticipate rapid benefit from its use, and moreover my poor patient's time in town being very limited, I at once commenced with heroic doses of the gas, and carefully watched the effects of the treatment throughout. The first day he inhaled fifteen pints, until it produced slightly unpleasant head-symptoms; this was followed, in the course of ten minutes, by a feeling of cheerfulness and general vigour of mind and body to which he had long been a stranger. Next day he appeared at the time appointed looking wonderfully improved in appearance, and informed me that he had felt "such an appetite," and "such a flow of spirits," ever since the previous day, that he could hardly realize the "astounding effects."

For the few succeeding days, a gradual increase of the gas was borne, until the dose reached thirty-five pints at one sitting. It was then gradually diminished, for he could not have tolerated a continuance of the



large doses. At the end of three weeks (his stipulated leave of absence) he left town completely restored in general health; all his distressing pains and other symptoms had disappeared; his countenance and the whole skin presented a perfectly healthy aspect, clear and of normal colour; and his mind had fully regained its natural tone and equilibrium.

Ever since his visit to town, he has felt himself fully equal to his usual duties, and in several communications that I have had from him, he has expressed himself "as deeply grateful for what, under the blessing of the Almighty" I had been able to effect in his very distressing malady.

It may be worthy of remark that the salient points of this case were a number of local venous congestions, consequent upon torpor in the general and capillary circulation, the result of long-continued loss of healthy tone and balance of the cerebro-spinal nervous system. Chronic congestion of the liver and portal system, of the kidneys, and of the brain, were very prominent symptoms; while stomach and hepatic derangement with consequent mal-assimilation was daily adding to the mischief. In such cases, even of very long standing and when pronounced hopeless, I have seldom found oxygen to fail, when fairly and properly employed.

#### SEVERE PERIODICAL HEADACHE.

Mrs. W—f, æt. 46, nervo-sanguineous temperament, had been subject from five years of age to

frequent attacks of severe pain in the head, and excitement or irritability invariably produced one. Origin, in childhood, unknown. The catamenia appeared at seventeen years of age, and then the cephalalgic attacks became periodical, regularly preceding for two or three days, accompanying, and continuing for a short time subsequent to the disappearance of the former, which usually were scanty and lasted not more than three hours. Marriage was recommended as the only chance of relief, and for the two years following the head was much better, but subsequently the neuralgic attacks became as severe as before. Has four children, the youngest three years old. Ever since the birth of the first child the catamenia have been, as a rule, of a more healthy character, lasting about a day and a half. Medical treatment of every kind, irrespective of expense, has been tried without avail; twice she has even been subjected to severe and hardly justifiable courses of mercurials. Unable to obtain more than temporary relief from orthodox practitioners, she has since tried homœopathy, &c., with no more favourable result.

*August 7, 1856.*—The following are this lady's present symptoms; neuralgic headache occurring monthly, of continued duration, from two days preceding to two days after the cessation of the catamenia, of so extremely acute a character as to oblige her during the whole time to preserve the horizontal position in a darkened room. No pain in the uterine or ovarian regions, but some in the loins, with copious rather offensive leucor-

rhæa; pulse 85, irritable and wiry, with strong pulsation in the carotids; digestion pretty good but liver sluggish; countenance tolerably healthy. Hoping that oxygen might prove useful, even if incapable of curing such a long standing case, I administered carefully, (for I saw clearly that only very small doses would be tolerated), 160 cubic inches of the gas diluted with twelve times the amount of atmospheric air. The inhalation of this small quantity, caused a sense of fullness in the cerebellum, which sensation however presently passed off, and my patient then expressed herself as feeling more lively, and with less weight about the head. The second dose somewhat larger, on the following day, had the effect of bringing on the period, without any headache, a week before the ordinary time, and it continued rather longer than usual. My patient took a daily dose for about a week, and then *all* her unpleasant symptoms having disappeared and the periodical headache not having shown itself, she ceased taking the gas, contrary to advice. Three weeks afterwards she again appeared, fearing a return of her complaint at the approaching period. For a week she had an inhalation on alternate days, none of her former sufferings supervened, and she felt perfectly well. The process was repeated at the succeeding catamenial period as a prophylactic. I learnt several months afterwards, that the distressing affliction of this lady had completely succumbed to my treatment.

## CHRONIC BRONCHITIS, HEPATIC AND PULMONARY CONGESTION, WITH SEVERE ATTACKS OF HUMID ASTHMA.

Major W——, a gentleman who had resided a good deal in hot climates, consulted me October 17, 1856. Has been liable for some years to hepatic derangement and to bronchial attacks. Recurrences of these attacks at length took place so frequently, as seldom to allow him an intermission of more than a week or two; and he now states, that for some time he has been subject every afternoon or evening, and not unfrequently at other periods, to severe paroxysms of cough and wheezing, which always continue until he brings up a large quantity of mucus. Hydropathic has been the only treatment from which much *temporary* benefit has been experienced.

The purple appearance of the face, the amount of blue venous ramifications on the nose and cheeks, the yellow conjunctivæ, the full labouring pulse, the presence of hæmorrhoids, all evidence general congestion, specially localised in and affecting the functions of the liver and lungs.

An intention to leave England for France in a fortnight being expressed, I was asked whether oxygen would be likely to do *any* good in that short time. To this I replied, that undoubtedly it would do much, but I feared that I could not promise *a cure* under six weeks or two months. With this understanding, and with a recommendation to continue the occasional use of his wet compress, (for the preservation of regularity

of bowels), he underwent a steady course of the gas for the fortnight, with such a complete relief to all his symptoms, and such a pleasing change in his unprepossessing complexion, that he spontaneously determined to incur some extra expense and alter his previous arrangements, rather than forego the advantage of another week's treatment.

At the termination of three weeks' course, this gentleman expressed himself enthusiastically as feeling perfectly well, and I found that the congestive and other distressing symptoms had quite disappeared. "If ever I feel any return," said he, "I shall certainly, if possible, again consult you." It may not be amiss to add that oxygen was the only medicinal agent employed by me in this case.

ORGANS OF SENSE PARALYZED, GENERAL PARALYSIS  
THREATENING.

A married lady, æt. 51, residing in Cheltenham, was persuaded to visit London for the purpose of placing herself under my care. For some years she had experienced great mental anxiety with general derangement of health. During the previous winter and spring her debility much increased; constipation, which for fifteen years had necessitated the frequent use of aperients, gave place to a rather relaxed uncomfortable state of the bowels with very troublesome flatulence; formerly robust, she became much attenuated, for the digestive and other organs were so weak, that the system could only appropriate a very small quantity of the food

taken. A very annoying eruption of a leprous character about the ears and temples had troubled her for several years. A few months since she had caught a bad cold, which owing to the debilitated state of her vital powers remained unsubdued, and degenerated into severe chronic bronchitis. Her eye-sight became very dim, hearing much impaired, the senses of taste and smell entirely lost; there was a constant feeling of chilliness and feverishness even in the warmest apartment; and although formerly an excellent walker, she became unable to take the slightest exercise without great fatigue and pain in the back, the lower extremities almost refusing to support the weight of the body. She felt in her own language "as if all her senses were going, and that she could not last long." The catamenia, formerly of natural character, ceased last year.

*May 12th, 1856.*—This lady could just walk up to my consulting room. Her countenance presented an anxious appearance; she could not read even very large print; with great difficulty could she be made to hear the questions put to her; she had no sense of taste or smell whatever, even when substances of the most powerfully bitter and odoriferous nature were applied to the respective organs of those senses; the head felt oppressed with a constant weight and tension; the back of the neck was very stiff and painful when moved; the face was drawn to one side, and upon being requested to show her tongue she involuntarily protruded it towards the right side. She experienced much weakness and pains in the loins

(ovarian congestion); complained of always being chilly and cold; and moreover she suffered from constantly recurring paroxysms of distressing spasmodic cough, accompanied with copious mucous discharge from the bronchii. Abundant evidence was afforded that this patient was in the very jaws, of what might have been under the circumstances, a fatal attack of paralysis.

A strong dose of oxygen was immediately administered, and I had the surprise and satisfaction of finding that in ten minutes all the oppression about the head had left her; suddenly she exclaimed, "Why, I can hear everything you say, perfectly." In a few minutes more she felt so much invigorated that she walked round the room quite astonished at her rapid acquisition of strength. In half an hour after she entered the room, just as she was taking leave, she abruptly turned to a book on the table and almost screamed "I declare I can see every word." To which I rejoined, "Only the large print, I suppose." "Oh, no! I can read the very small print," and taking up the book she proved that she could. Subsequently I was informed that in the course of the following night the catamenia again made their appearance after many months' cessation, and that the pain in the back and loins was quite relieved.\*

For four days, inhaling daily, my patient gradually progressed in strength; but I was not quite satisfied

\* It should be here remarked that there was (and this is always the case in using oxygen) no subsequent depression. The improvement was likewise permanent.

with one point, *viz.* the persistent chilliness. The oxygen was then pushed further. The first very large dose had at once the desired effect of creating a full genial warmth throughout the system, which continued for the whole day; but there being in the evening some slight return of coldness and shaking, a second dose similar in strength was taken—after this the natural warmth was permanently re-established. Oxygen was continued daily in smaller doses for a period of six weeks. In three weeks after the first inhalation the senses of taste and smell were completely restored; in one month the severe cough had quite disappeared; and before the termination of the six weeks' treatment my patient was able to walk many miles without the slightest inconvenience. She then left London, merely complaining of some remains of the old eruption upon the ears and temples. *En passant*, I ought not to omit one or two other points of this interesting case. The complexion, which for some time had been muddy-yellowish and much wrinkled, soon assumed so fair and pink an appearance as to elicit various congratulatory remarks from her friends. From the very commencement of the inhalation, the troublesome flatulent distension of the bowels disappeared, and the evacuations regained their healthy appearance.

AMENORRHOEA, WITH SEVERE GENERAL SYMPTOMS.

Miss J. W., æt. 18, residing in Tyburnia, accompanied by her mother, consulted me March 23rd, 1857. Bilio-nervous temperament; good health until 14 years



of age, since which period she has never been well, and latterly has suffered increasingly from ill health.

Pulse 80, very weak; face of a leaden colour, and puffed; eyes hollow and dull, with want of action in the iris, and surrounded by dark areolæ; tongue furred, with red tip; some pain in the epigastrium, upon pressure, and always after eating; ascending and transverse portions of colon much distended; once in two or three months has suffered from dysmenorrhœa with very slight appearance, but for several months has had complete amenorrhœa. She feels listless, and is easily fatigued; the extremities are always cold, and she frequently experiences much uneasiness in the spine.

As I had met with many cases of a nature by no means dissimilar to this young lady's, in which oxygen had been advantageous, I at once strongly recommended its employment. In about a week or ten days the catamenia appeared, for the first time of a natural character, and without pain; the course of the gas (without any other medicine), lasted but little over a fortnight, and then my patient, from a belief that she was completely put aright, discontinued it. I feared that the very short period of treatment would prove anything but satisfactory, but was gratified to find, two months later, that she felt herself in perfect health, having had no recurrence of her former symptoms.

EXTREME CEREBRO-SPINAL DEBILITY, WITH  
SPERMATORRHŒA.

J. T——s, æt. 26, a good-looking and very prepos-

sessing man, the upper servant of a well-known M.P., requested my advice, May 5, 1857. Has been married for five years, but has *no family*; temperament bilio-nervous; countenance sallow; pulse extremely weak, fluttering, and with a somewhat prolonged intermission succeeding every six or eight beats; skin moist, cold, and clammy, feeling exactly like the well-known perspiration on the forehead of a moribund person; great spinal weakness and *emissiones seminis invitat omni nocte*, with considerable uneasiness in the occiput and nape of the neck (medulla oblongata and parts adjoining), which appears often to affect the eyes; frequent vertigo and headache; bowels very obstinate, with painful and distressing straining.

Opposed to these positive are the following important negative indications. No physical or general signs of either cardiac or pulmonary affection; can get through a tolerable amount of work, although he very soon feels himself knocked up, and is often obliged to rest himself; no stomach or hepatic derangement, tongue being perfectly clean, and the appetite good.

Before marriage I find that he *se mori malo assueverat*, the origin, I doubt not, of his ill health. Notwithstanding marriage, however, his health and strength has gradually undergone considerable deterioration, He has without avail, or with slight temporary benefit, tried every mode of treatment that appeared to promise a hope of restoration; and the poor fellow's spirits are evidently extremely depressed in consequence; states that he was induced to come to me from knowing that

his master's brother had received so much benefit from my advice.

As I had met with considerable success in two previous cases, something similar in character, although without symptoms of such extreme severity, I felt myself justified in recommending a course of oxygen gas. Encouraging him as much as possible, and ordering his spine to be rubbed with oil for half an hour every night, I likewise ordered 12 pints of the gas, diluted with eight times the amount of atmospheric air, to be inhaled daily, at one sitting, two hours after a meal. I saw him six days afterwards, and to my surprise he told me that the treatment had had an extraordinarily beneficial effect, that he felt himself "quite a different man," and that he really could now get through his work with pleasure, and had only had *unam emissionem* in five days. His symptoms, generally, I found mitigated, but the pulse was still extremely weak and intermittent; his face, however, had lost all its anxiety and depression.

He continued taking his gas daily, and visiting me once every five or six days, until the 30th, when my note book says that he had experienced three *emissiones* during the preceding week; that he had been subjected to a good deal of hard work, which previously would have quite knocked him up; and that nevertheless he now felt himself unusually well. The pulse had, I found, lost its intermittent character, the skin felt natural, the bowels had become regular, although still attended with some straining and mucus. Hitherto I had disallowed opening medicine, which he

had from necessity acquired the habit of taking, but I now recommended a small dose of sulphur every other night, and hyd. bichl. gr.  $\frac{1}{8}$  with cinchona once a day.

My patient still continued seeing me once a week, until July 3rd, when he felt himself to be, and appeared so perfectly well and strong, that he needed no further treatment, and it was therefore by my advice discontinued.

## CONCLUSION.

In recording my views of oxygen as a most powerful, valuable, safe, and agreeable curative agent, when properly exhibited—as *singly* possessing this admirable combination of properties and capable of far more extensive range in its application to disease than any other remedy—as pre-eminently Nature's own therapeutic, affording assistance in her own way without opposing the intentions of her ever-present *vis medicatrix*—as incontestably entitled to the position of a *curative* (either alone or as an adjunct) in a variety of intractable diseases otherwise incurable, or at least tacitly acknowledged to be so by any other known means;—I must request the indulgence of the reader, as far as relates to any hypothesis that I may have advanced in these pages. In the absence at present of any other scientific explanation as to the true *rationale* of an increased oxygen-supply in disease, and of the singular success attendant thereupon,—I may fairly hold opinions formed

advisedly, until they are proved to be untenable. When, however, I proceed to review the successful facts in practice which I have offered as proofs of the efficacy of the therapeutic means which I now advocate, I at once feel my position to be almost unassailable. Laying aside hypothesis, however reasonable, for a moment,—facts remain in their integrity. These facts establish, beyond possibility of question, that an increased supply of oxygen may be administered by inhalation, and in some few cases by the skin, with happy and well-marked effects in the treatment of various diseases; and that rapid and permanent cures have been thus obtained after long trials and failures of the most approved and judiciously-advised routine treatment.

In the foregoing selection of Cases, it has been my earnest endeavour to avoid any possible charge of *post hoc ergo propter hoc*. It will be observed that most of the cases are tolerably well marked, and in some the rapidity with which oxygen demonstrated its therapeutic power so much surprised myself, that any reader may be pardoned a passing doubt.\*

\* Should any professional brother privately request the favour, it would at any time afford me much pleasure to give names and to explain many cases more fully, where I can do so without breach of professional confidence.

I may with perfect safety predict that, sooner or later, oxygen will be admitted as a highly valuable portion of routine treatment. That which it has done in my hands, *it must necessarily effect in the hands of every one who will only use it as carefully and attentively as I have done. With experience comes knowledge.*

FINIS.











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